ARCHAEOLOGICAL INVESTIGATIONS AT LAND TO THE REAR OF MARKLE GROVE, EAST RAINTON, SUNDERLAND TYNE AND WEAR

POST-EXCAVATION ASSESSMENT REPORT

DECEMBER 2017

PRE-CONSTRUCT ARCHAEOLOGY

Archaeological Investigations at, at land to the rear of Markle Grove, East Rainton, Sunderland, Tyne and Wear

Post Excavation Assessment Report

Central National Grid Reference: NZ 33710 48126

Site Code: ERS 16

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DOCUMENT VERIFICATION

ARCHAEOLOGICAL INVESTIGATIONS LAND TO THE REAR OF MARKLE GROVE, EAST RAINTON, SUNDERLAND
TYNE AND WEAR

POST-EXCAVATION ASSESSMENT REPORT

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1. NON-TECHNICAL SUMMARY

1.1 An archaeological strip, map and record excavation was undertaken July to August 2016 by Pre-Construct Archaeology Limited on behalf of Avant Homes on land to the rear of Markle Grove, East Rainton, Sunderland ahead of a residential development. The overall development site, centred at National Grid NZ 33710 48126, comprises an irregular-shaped parcel of land covering *c.* 4.4 hectares located south-east of Durham Road, immediately to the east of the village of East Rainton. Prior to commencement of the development, the site was two arable fields separated by a mature hedgerow.

1.2 Avant Homes were granted outline planning permission for residential development of the site. The planning permission included a condition requiring archaeological work, specifically to undertake a strip, map and record excavation in the southern part of the overall development to further investigate features and deposits that were identified during previous phases of archaeological work.

1.3 An archaeological desk-based assessment of the development site undertaken in 2013 identified the potential of the site for archaeological remains of the prehistoric and medieval periods. A geophysical survey undertaken in 2015 identified several anomalies representing buried sub-surface features including a substantial linear anomaly that ran along the western edge of the site interpreted as a ditch of probably medieval date. Other anomalies interpreted as potentially medieval in date include a NW-SW aligned linear anomaly extending across the northern part of the site and several discrete anomalies potentially representing areas of burning such as kilns or furnaces and pits. A series of evenly spaced NE-SW aligned anomalies identified across the site represent a ridge and furrow system. A trial trenching evaluation undertaken in 2016 identified the presence of significant archaeological features of medieval date including a ditch up to 0.70m deep along the western edge of the site. Three medieval kilns/furnaces were recorded across the site each comprising a circular bowl and a narrower flue. One kiln contained in-situ daub lining and heat affected stone-lining.

1.4 The scope of work for the archaeological strip, map and record excavation was set out in a specification compiled by the Tyne and Wear Specialist Conservation Team. A rectangular area covering *c.* 1.4 hectares within the southern portion of the overall development site was to be investigated prior to development.

1.5 The archaeological features recorded during the strip, map and record excavation have been placed within seven broad phases of activity. Natural geological material (Phase 1) was exposed as the basal deposit across the area investigated.

1.6 Features assigned to Phase 2 activity included part of a substantial ditched enclosure along the western margin of the site which probably represents the eastern boundary of a settlement located beyond the edges of the development site. This ditch was exposed along the western edge of the site for a maximum distance of *c.* 70m and continued beyond the

western and southern limits of the excavation area. There was a *c.* 10m wide east-facing entrance in the south and at its northern extent, the ditch began to curve round to the west, continuing beyond the limits of excavation, indicating that this was the north-east corner and that the interior of the enclosure lay beyond the excavated area to the west, with remains potentially surviving to some extent within the gardens of an area of residential housing. The ditch measured up to 3.80m wide by up to 2.14m deep, and had evidently been subject to at least one re-cutting event. Charred material taken from the lower fills were submitted for radiocarbon dating and produced AMS dates of 404–231 cal BC (SUERC 75899) and 400–211 cal BC (SUERC 75900). The initial silting, and presumably the original cutting of the enclosure ditch, is therefore dated to the Middle Iron Age.

1.7 A sinuous, shallow segmented ditch extended across the eastern edge of the site over a distance of 83m. Fourteen segments were recorded, most with very narrow gaps between, with each segment differing in length and profile. The function of this feature is uncertain; its segmented form precludes its use as a drainage feature and it has tentatively been interpreted as a possible boundary feature that may represent the large scale and planned division of land. Two samples of charred material were submitted for AMS dating charcoal; both produced dates in the early medieval period: 895–1019 cal AD (SUERC 75904) and 771–963 cal AD (SUERC 75905). The segmented ditch is not however considered likely to date from the medieval period due to its form and its stratigraphic position beneath a colluvial deposit and sub soil and it likely that the medieval material was introduced into the feature though ploughing and bioturbation. Based on dates recovered from similar large-scale boundary features within the north of England, a potential late Bronze Age or early Iron Age date is considered more likely.

1.8 A substantial colluvial (hillwash) deposit (Phase 3) was recorded within the south-eastern corner of the site and directly overlay Phase 2 features.

1.9 Phase 4 represents medieval activity at the site. The Phase 2 prehistoric ditched enclosure along the western margin of the site was truncated by a substantial ditch; pottery of 12th- to early 14th-century date was recovered from its fills. Three shallow ditches recorded across the central part of the site probably represent surviving elements of a system of medieval enclosure boundaries. Discrete features (postholes and pits) were recorded across the investigated area from which a small assemblage of finds was recovered including medieval pottery, bone, fired clay, slag and a corroded iron object. Significant industrial and processing activity is represented by a group of four very well-preserved corn-drying kilns and six hearths.

1.10 All four corn-drying kilns recorded at the site had a similar pear-shaped construction cut, although their construction methods, size and the materials used differed significantly. One of the corn-driers had a dry stone lining and two examples had evenly-spaced postholes and stakeholes located around the perimeter of the bowls which would have housed vertical stakes for a wattle and daub structure strengthened with horizontal withies and covered with

clay. This structure would have formed the support for the drying floor constructed above the base of the bowl of the kiln, and presumably the upright timbers tapered to form a domed roof over the drying floor. A small assemblage of pottery of 12th- to 13th-century date was recovered from the backfill deposits within the kilns. The palaeoenvironmental remains recovered from the corn-drying kilns are of regional significance. Samples taken from the basal deposits of the corn-drying kilns along with selected backfill deposits produced cereals of barley, wheat and oat, indicating that arable multi-cropping was practised. One of the kilns had burnt down leaving the final crop of oats in situ. Evidence for the fuel used in the corn driers was also recovered from the samples. The identifiable charcoal was mostly oak, hazel/alder and alder with gorse/broom, Maloideae and cherry/blackthorn occurring much less commonly.

1.11 A developed soil (Phase 5) was recorded extending across the site and overlay Phase 4 features and deposits. Phase 6 is represented by features associated with agricultural activity at the site. A group of NE-SW aligned furrows were recorded across the site that represent the surviving elements of a more extensive ridge and furrow that would have extended across the site. Although no datable artefactual material was recovered from these features they probably date to the later medieval period or later. Topsoil (Phase 7) formed the existing ground surface.

1.12 This assessment of the data recovered from the investigations has concluded that the prehistoric and medieval remains are of regional significance and further analysis leading to publication will be required as detailed in the Specification for the archaeological mitigation.

2. INTRODUCTION

2.1 General Background

2.1.1 This report details the methodology and results of a programme of archaeological investigations undertaken by Pre-Construct Archaeology Limited (PCA) between July - August 2016, on land to the rear of Markle Grove, East Rainton, Sunderland. The central National Grid Reference for the site is NZ 33710 48126 (Figure 1). The investigations were commissioned by Avant Homes (the client) with work being carried out ahead of the development of the site. The archaeological project was undertaken as a condition of the planning permission (ref. 14/00506/OUT) on the recommendation of the Tyne and Wear Specialist Conservation Team who provide archaeological advice to the Local Planning Authority (LPA) Sunderland City Council.

2.1.2 The archaeological potential of the site was established by an archaeological desk-based assessment (AD Archaeology 2013) which identified the potential for the presence of buried remains for the prehistoric and medieval periods. A geophysical survey (AD Archaeology 2015) identified several anomalies representing potential buried sub-surface features. Subsequently a trial trenching evaluation (AD Archaeology 2016) was undertaken which identified the presence of significant archaeological remains that broadly corresponded with the anomalies identified by geophysical survey (Figure 4).

2.1.3 The scope of work required to fulfil the relevant planning conditions was set out in a detailed specification compiled by the Tyne and Wear Specialist Conservation Team (Newcastle City Council 2016).

2.1.4 The archaeological project herein described was designed according to the guidelines set out in Management of Research Projects in the Historic Environment (MoRPHE) (English Heritage 2006b). In line with MoRPHE guidelines, this Assessment Report sets out a formal review of the data collected during the fieldwork.

2.1.5 At the time of writing, the Site Archive, comprising written, drawn, and photographic records is housed at the Northern Office of PCA, Unit N19a Tursdale Business Park, Durham, DH6 5PG. When complete, the Site Archive will be deposited at Tyne and Wear Archives and Museums, Arbeia Roman Fort, South Shields, Tyne and Wear, under the site code ERS 16. The Online Access to the Index of Archaeological Investigations (OASIS) reference number for the project is: preconst1-293480.

2.2 Site Location and Description

2.2.1 The site lies to the east of the A690 situated immediately to the north-east of the village of East Rainton. The overall development site is centred at National Grid Reference NZ 29122 15650 and comprises an irregular-shaped parcel of land measuring *c.* 400m north-south by *c.* 200m east-west covering *c.* 4.4 hectares (Figure 1). It is bounded to the west by Durham

Road, by residential properties and Markle Grove to the south and by the Hetton Bridleway/Footpath 9 and a mixture of arable fields and woodland to the east.

2.2.2 The area of the strip, map and record excavation comprised a rectangular shaped area of land within the southern part of the overall development site which measured up to 134m NW-SE by up to 125m NE-SW covering *c*. 1.4 hectares (Figure 2).

2.2.3 When the archaeological work herein described commenced, the overall development site comprised two fields divided by a mature NE-SW aligned hedgerow with the development of the northern field underway.

2.3 Geology and Topography

2.3.1 The solid geology of the area is Pennine Middle Coal Measures Formation Sandstone formed in the Carboniferous Period with overlying superficial Devensian/Diamicton till deposits (British Geological Survey website).

2.3.2 Across the overall development site there is a gradual eastwards slope, dropping away from the village of East Rainton to the south-west. The area of archaeological investigation within the southern part of the site comprised a rectangular shaped area of *c*. 1.4 hectares. At this location the site gradually sloped downwards from the west from a maximum height of *c*. 85.80m AOD to a minimum height of *c*. 76.80m AOD to the west.

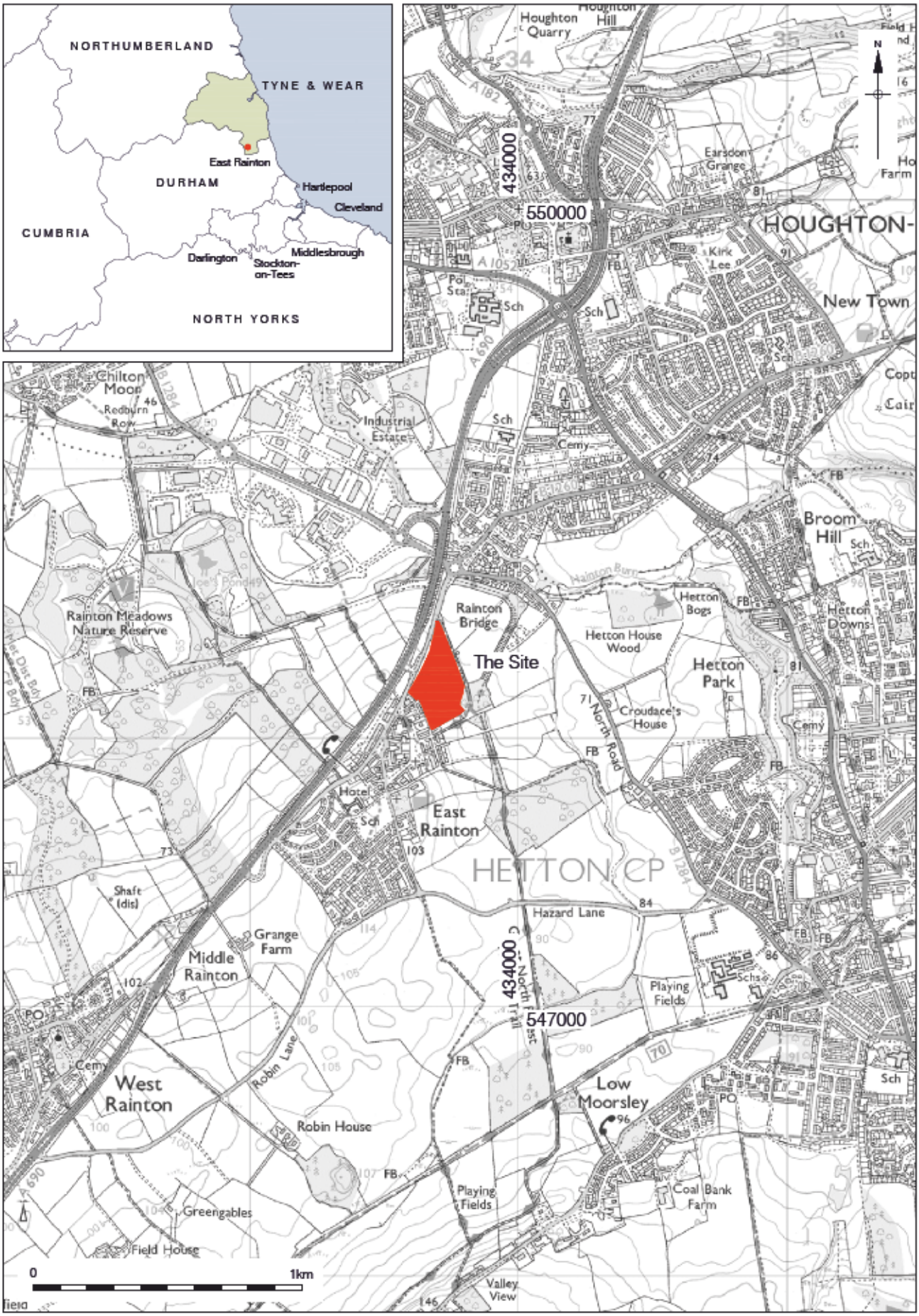

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Figure 1
Site Location
1:20,000 at A4

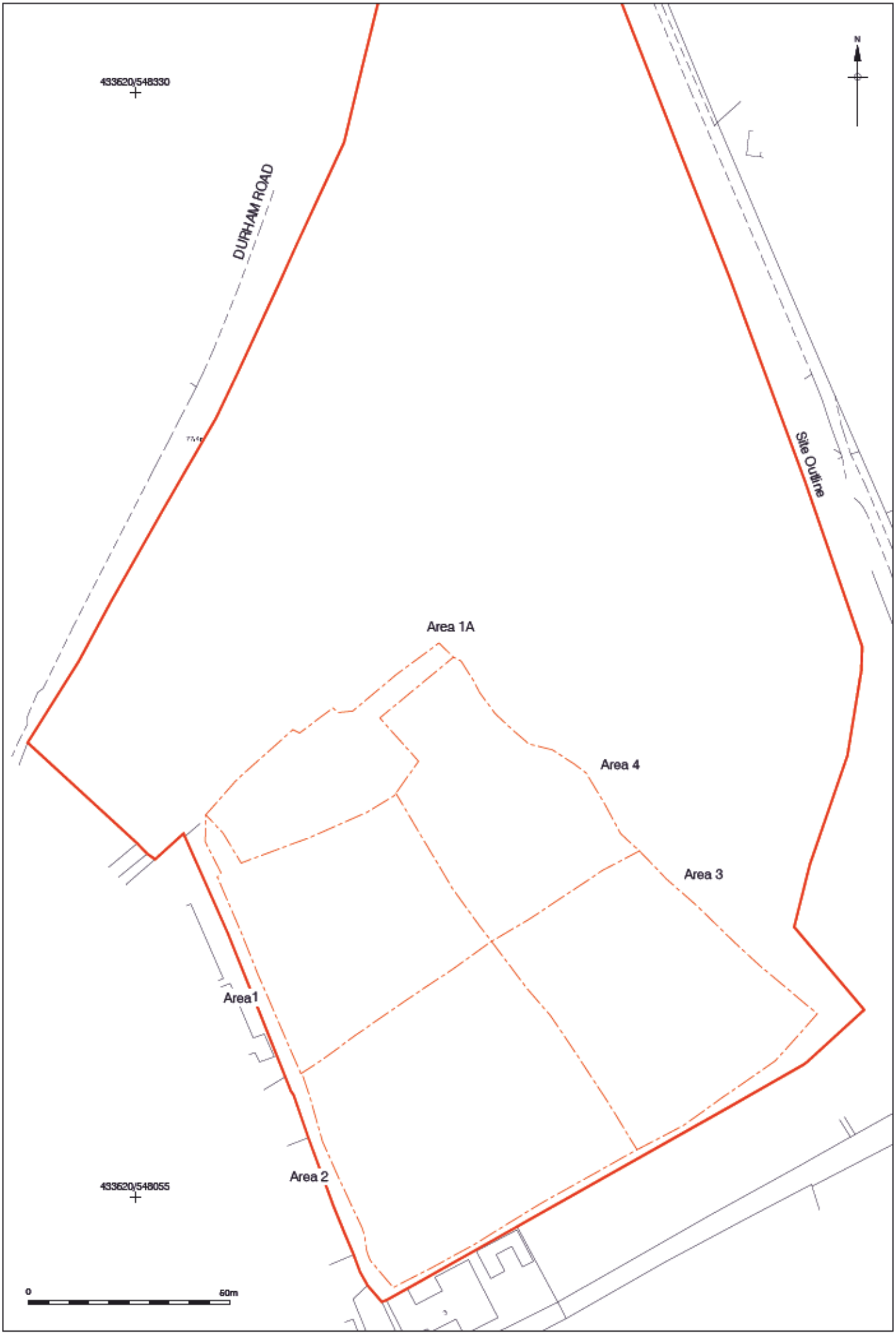

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Figure 2
Area Location
1:1,250 at A4

2.4 Planning Background

2.4.1 Avant Homes has been granted outline planning permission for a residential development comprising 93 dwellings with associated access and landscaping (ref: 14/00506/OUT & 16/0062/P7), on land to the east of Durham Road, East Rainton (Figure 3). The planning permission included a condition requiring archaeological work, specifically a strip, map and record excavation to expose and record significant archaeological remains identified by previous archaeological work within the southern part of the overall development site.

2.4.2 The planning application for the residential development was granted subject to archaeological conditions:

> *A further programme of archaeological work involving a Strip, map and Record (with the full excavation of industrial features) is required in the south-western portion of site prior to development;*

2.4.3 Justification for the condition within the planning permission was to comply with Policies B11, B13 and B14 of the Sunderland City Council Unitary Development Plan (UDP) Core Strategy Document Plan (adopted 1998) and UPD revisions (alteration No.2, adopted 2007), as the site is known to contain features of local archaeological importance:

> *B11- The City Council will promote measures to protect the archaeological; heritage of Sunderland and ensure that any remains discovered will be either physically preserved or recorded.*
>
> *B13- The City Council will seek to safeguard sites of local archaeological significance. When development affecting such is acceptable in principle, the council will seek to ensure mitigation of damage through preservation of the remains in situ as a preferred solution. Where the physical preservation of remains in the original situation is not feasible, excavation for the purpose of recording will be required.*
>
> *B14- Where development proposals affect sites of known or potential archaeological importance, the city council will require an archaeological assessment/evaluation to be submitted as part of the planning application. Planning permission will not be granted without adequate assessment of the nature, extent and significance of the remains present and the degree to which the proposed development is likely to affect them.*

2.4.4 The planning permission also had to comply with paragraphs 141 of the National Planning Policy Framework (NPPF 2012):

> Para. 141: *"Local planning authorities should make information about the significance of the historic environment gathered as part of plan-making or development management publicly accessible. They should also require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make*

this evidence (and any archive generated) publicly accessible. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted"

2.4.5 The scope of work required to fulfil the relevant planning conditions was set out in a detailed specification compiled by the Tyne and Wear Specialist Conservation Team (Newcastle City Council 2016), therefore a Written Scheme of Investigation (WSI) was not required.

2.5 Archaeological and Historical Background

Information in this section is largely extracted from the archaeological desk-based assessment (AD Archaeology 2013) and the research and writing of those responsible is acknowledged. Below is a summary of the archaeological and historical background Supplementary information has been added from various sources. The Tyne and Wear and Durham Historic Environment Record entry numbers are distinguished by the HER prefix.

Early Prehistoric (Mesolithic to Bronze Age)

2.5.1 Although no HER entries relating to the early prehistoric periods at the site were identified by the desk-based assessment, early prehistoric finds within the wider vicinity of the site were reported including a small scatter of Mesolithic and early Neolithic flint finds thought to have come from Pittington, to the south of the site (Durham HER H121) with further Mesolithic flint finds are reported from the Pitting Hill area further to the east

Iron Age to Roman Period

2.5.2 No evidence for Iron Age to Roman period activity was identified by desk-based assessment at the site or within its near vicinity.

2.5.3 The site does however lie within a landscape which is known to have been densely occupied by agricultural settlements and intensively farmed during the Late Iron Age and Early Roman periods. This is highlighted in the recent archaeological assessment of the aggregate-producing areas of the county, which the site lies in the northern extent of, concluded that there is potential for Iron Age settlement sites to be situated practically anywhere in this area (Hewitt 2011, 62).

2.5.4 A recent example of later prehistoric settlement activity recorded within the wider vicinity of the site was at Hilltop Farm at Broomside, *c*. 3km to the south-west of the site, where elements of a ditched enclosure representing a settlement focus of probably Iron Age date, along with elements of an undated, but presumed to be contemporary, wider system of field enclosures (PCA 2013). This site was initially identified by aerial photography (HER 389) and by later geophysical survey (ASDU 2007) indicating that the enclosure was roughly square with a possible eastern entrance. Further excavated examples of sites of this type within the wider area include West House, Coxhoe (Haselgrove and Allon 1982) and Bowburn (Graham 2009), both in County Durham but in the near vicinity of the site.

Early medieval

2.5.5 Although there is no evidence of early medieval activity within the development site, the village of East Rainton is likely have an early medieval origin. The earliest known reference to Rainton is in *Symeon's History of the Church of Durham* (1125) where it is suggested the two villages of Rainton form one *vill,* and the name possibly derived from the old English *Reignald's tun* after its builder, son of Franco, one of the seven bearers of St. Cuthbert (Mawer 1920).

Medieval

2.5.6 There are numerous documentary references to Rainton in the medieval period with the earliest reliable reference being the *Foederarium Prioratus Dunemense* (*c*. 1125) where it is described as an ancient manor and park of the Prior and Convent of Durham. The *Boldon Buke* (1183) refers to "a moiety of the mill of Rainton" and 'The mills of Newbottle, of Biddick with half of the mill of Rainton yield is 15 marks' with these probably referring to mills at Middle Rainton or Rainton Gate located to the north-east of the development site (HER 3190). The is also a 12th-century reference to Rainton in John's confirmation of Henry II's charter; at this time it comprised 7 free tenants with 1 messuage, 60 acres land and 5 acres meadow each (HER 272). Land holdings with reference to East Rainton are documented throughout the later medieval and early post-medieval periods in the Halmote Court Rolls and Gillycorn Rent Assessments with the earliest of these being a Halmote Court roll of 1296 (Watts 2002). These documents also refer to the presence of a mill at Rainton Gate.

2.5.7 Information about the layout of East Rainton village during the medieval period (HER 272) is based on its earliest depictions on 19th-century maps, discussed below, and it probably comprised an irregular street pattern centred on a large open area 'village green'. During the medieval period, the development site lay immediately to the north-east of the medieval core of East Rainton village and probably formed part of agricultural fields associated with the village.

Post-medieval and modern

2.5.8 The earliest mapping evidence depicting the village of East Rainton is John Gibson's map of 1788 annotated 'East Raynton' and is illustrated as a group of buildings lining a T-shaped junction. The Gibson map does not provide any detail for the layout of the village of East Rainton and the earliest accurate depiction of East Rainton village is shown on Greenwoods County plan of 1820 and the 1839 tithe plan where it shows an irregular street pattern centred on a large open elongated area with back lanes on all sides, this likely to broadly reflect the layout during the medieval period. Subsequent 19th- and 20th-century maps depict the development site as open fields with various arrangements of sub-divisions over time. At the time of the archaeological work, the development site comprised two fields divided by a mature hedgerow.

2.5.9 During the 19th century it was the coal industry that drove the development of the North East with numerous entries listed in the HER associated with extraction and transportation

of coal within the immediate and wider vicinity of the development site. Within the immediate vicinity of the site entries associated with the coal industry include the Dunwell Pit (HER 3206) located immediately to the south-east of the site and to the north of the development site the East Rainton Railway Spur (3204) and a coal depot (HER 3203).

Recent archaeological work

2.5.10 The archaeological potential of the site was initially established by the 2013 desk-based assessment. Although no known archaeological assets were identified within the site itself, it does lie immediately to the east of the medieval core of East Rainton village. At this time the site would probably have been occupied by agricultural fields associated with the medieval village. It was also highlighted that due to the peripheral location of the site to the medieval core of East Rainton village there was the potential for the remains of medieval activity associated with craft industries and/or processing of agricultural produce and raw materials to be present.

2.5.11 The geophysical survey (Figure 4) undertaken at the development site in 2015 identified a substantial linear anomaly along the western edge of the site interpreted as a possible ditch. Several discrete anomalies were also identified and interpreted as thermoremanent features possibly representing areas of burning or features such as kilns and furnaces, and further discrete anomalies that could represent large pits.

2.5.12 The trial trenching undertaken in 2016 comprised the investigation of ten trenches which identified archaeological features of significance within the south-western portion of the development site (AD Archaeology 2016). The trenches were sited to assess the geophysical anomalies; Trenches 8 and 9 recorded part of a substantial ditch along the western edge of the site and Trenches 7 & 10 recorded three substantial features interpreted as possible lime kilns. Although no datable material was recovered from these features, they were considered to be of medieval date based on their form and the composition of their fills.

2.5.13 In summary, the evaluation identified archaeological remains of significance within the southern part of the overall development site of probably medieval date. No archaeological remains of note were identified within the remaining areas investigated.

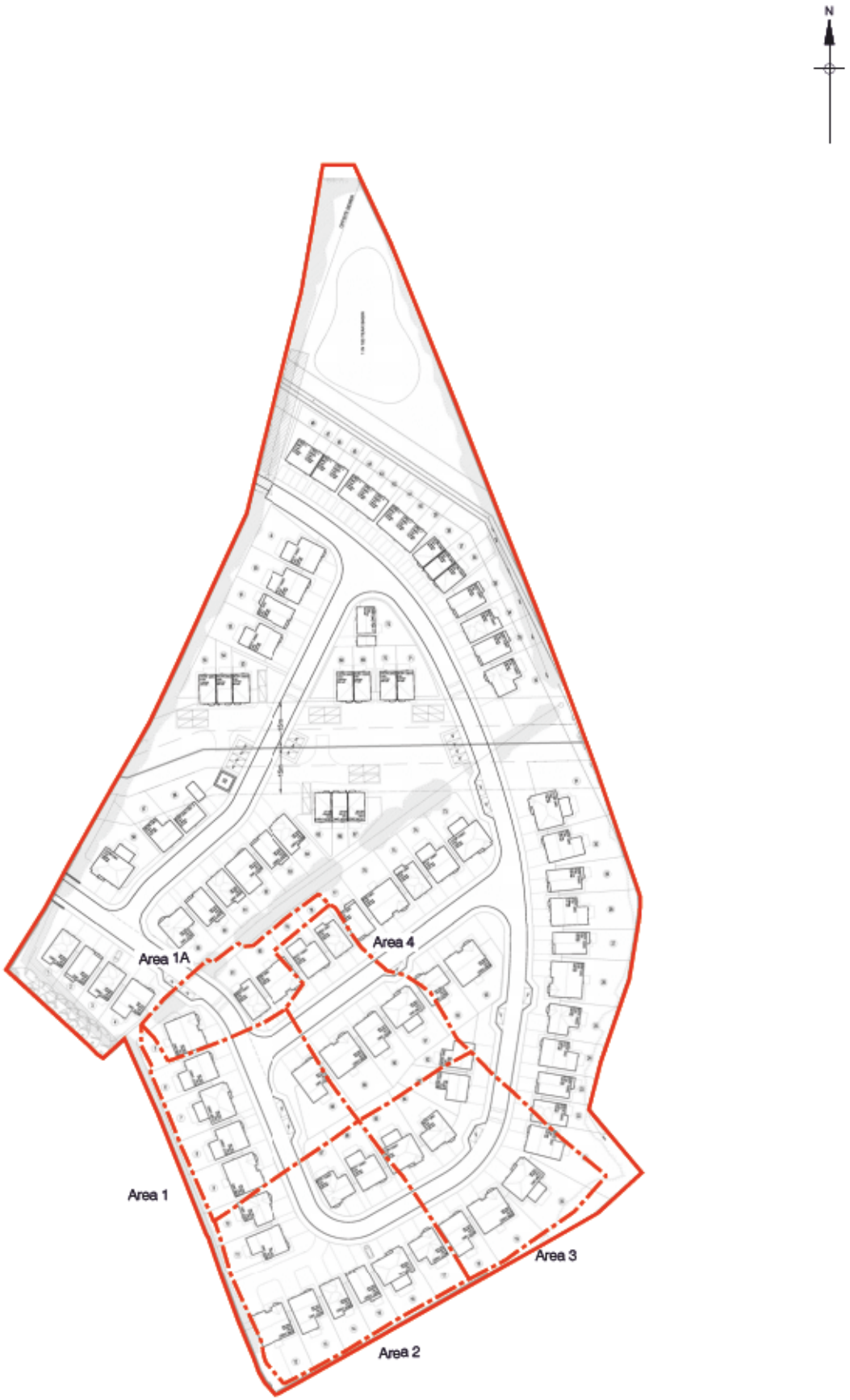

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Figure 3
Area Location and Proposed Development
1:2,000 at A4

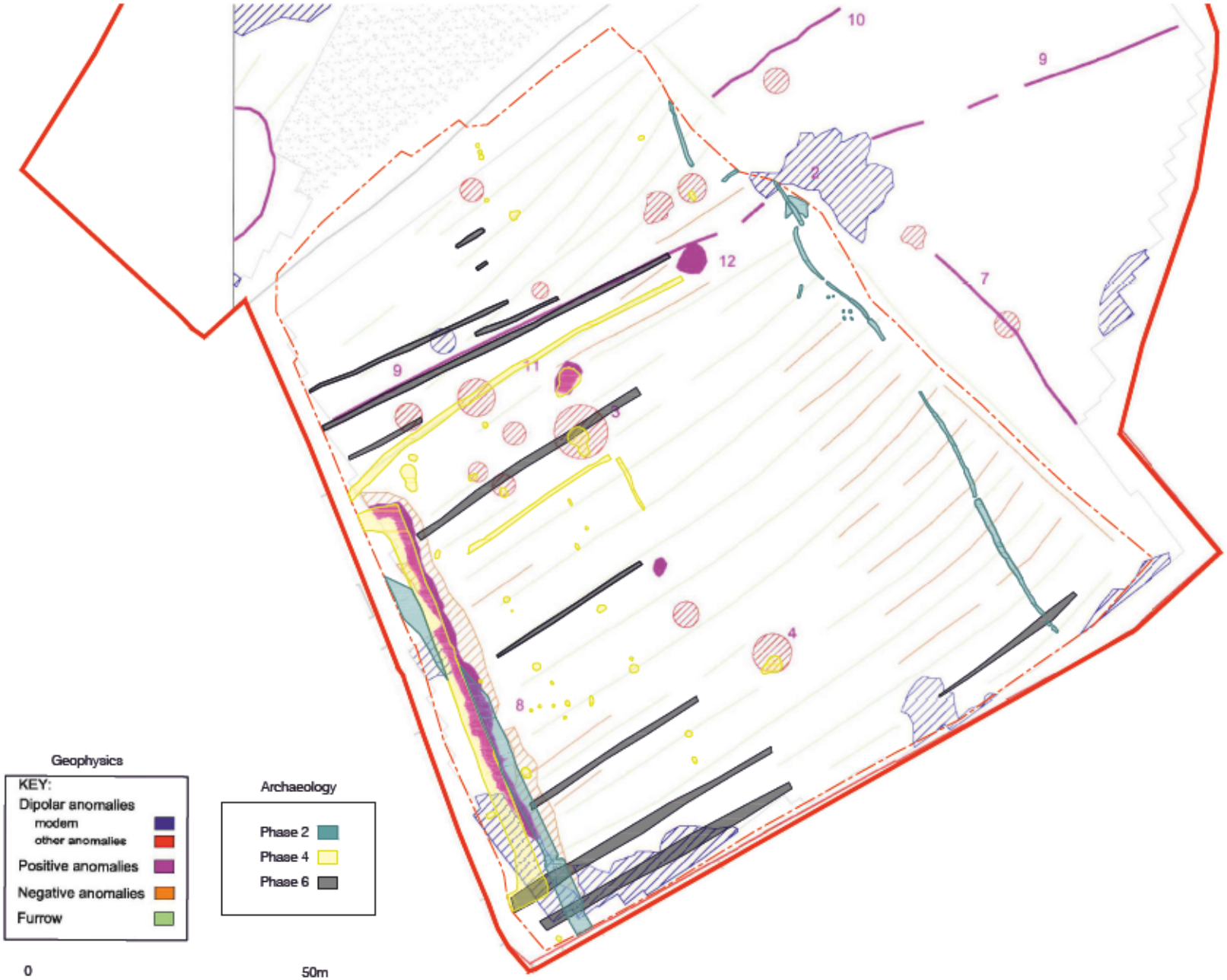


Figure 4
All Features and Phases Overlain onto Geophysical Survey Interpretation
1:1,000 at A4

3. PROJECT AIMS AND RESEARCH OBJECTIVES

3.1 Project Aims

3.1.1 The archaeological investigations at the site were threat led, since the development had potential to disturb or destroy significant sub-surface archaeological remains of the prehistoric and medieval period, specifically remains identified by previous archaeological investigations within the southern part of the development site.

3.1.2 An archaeological strip, map and record excavation was therefore required as part of the planning process. From the outset, the aim of the work was set out in a detailed Specification compiled by the Tyne and Wear Specialist Conservation Team (Newcastle City Council 2016). In sum, therefore, the main aims of the strip, map and record excavation, as outlined in the project Specification were:

- to ascertain the type and function of the previously identified kilns and the methods of construction;
- to expose features and deposits identified by previous archaeological investigations and;
- to characterise the nature, extent, distribution and degree of survival of buried archaeological remains, specifically pertaining to the prehistoric and medieval periods;
- to assess the significance of buried archaeological remains.

3.1.3 The broad aim of the project was to record the heritage assets within the development site prior to their destruction. Additional aims of the project were:

- to compile a Site Archive consisting of all site and project documentary and photographic records, as well as all artefactual and paleoenvironmental material recovered;
- to compile a report that contains an assessment of the nature and significance of all data categories, stratigraphic, artefactual, etc.

3.2 Research Objectives

3.2.1 Specific research objectives to be addressed by the project were formulated with reference to *Shared Visions: The North-East Regional Research Framework for the Historic Environment* (NERRF) (Petts and Gerrard 2006). The NERRF highlights the importance of research as a vital element of development-led archaeological work. It sets out key research priorities for all periods of the past allowing commercial contractors to demonstrate how their fieldwork relates to wider regional and national priorities for the study of archaeology and the historic environment. The aim of NERRF is to ensure that all fieldwork is carried out in a

secure research context and that commercial contractors ensure that their investigations ask the right questions.

3.2.2 Given the results of the desk-based assessment and archaeological evaluation (AD Archaeology 2013 & 2016), the project was considered to have high potential to contribute to existing knowledge of the prehistoric and medieval periods in the region.

3.2.3 The following research priorities for the prehistoric period (I) within the NERRF research agenda and strategy were considered to be of particular relevance to this project:

- Ii. Chronology
- Iii. Settlement
- Iiv. Material Culture: general
- Ivi. Material Culture: ceramics

3.2.4 The following research priorities for the Later Medieval period (MD) within the NERRF research agenda and strategy were considered to be of particular relevance to this project:

- MDi. Settlement
- MDvii. Medieval ceramics and other artefacts
- MDviii. Other medieval industries

3.2.5 In sum, the work had potential to contribute to key research priorities in the NERRF research agenda and strategy for both the Later Bronze Age and Iron Age periods and the later medieval period.

4. ARCHAEOLOGICAL METHODOLOGIES

4.1 Fieldwork

4.1.1 A detailed Specification compiled by the Tyne and Wear Specialist Conservation Team (Newcastle County Council 2016) set out the research aims and objectives of the project and, in a series of detailed method statements for project execution, described the techniques and approaches to be employed to achieve those aims and objectives (Appendix 12). The fieldwork and post-excavation work was undertaken in accordance with the relevant standard and guidance documents of the Chartered Institute for Archaeologists (CIfA) (CIfA 2014b). PCA is a CIfA-Registered Organisation. The fieldwork and post-excavation work was also carried out in accordance with the *Yorkshire, the Humber & The North East: Regional Statement of Good practice for Archaeology in the Development Process* (SYAS 2011).

4.1.2 The Tyne and Wear Archaeology Officer was notified in advance of the start date and provisional programme for the fieldwork and monitored the progress of the fieldwork throughout.

4.1.3 The archaeological strip, map and record excavation was undertaken across a roughly rectangular-shaped area within the southern part of the overall development site which measured *c*. 130m NW-SE by up to 125m NE-SW covering an area of *c*. 1.4 hectares (Figure 2). The excavation area was initially set out using a Leica Viva Smart Rover Global Navigation Satellite System (GNSS). The Smart Rover GNSS provides correct Ordnance Survey co-ordinates in real time, to an accuracy of 1cm.

4.1.4 To facilitate the scheme of works for the development it was agreed to undertake the strip, map and record excavation as a phased programme of work (Areas 1a, 1, 2, 3 & 4) (Figure 2 & 3). This method was employed so that once an area had been fully excavated and recorded it could be handed over for construction to commence.

4.1.5 In all areas, 'overburden', *ie*. topsoil and subsoil, was removed by tracked 30-tonne 360˚ excavator, using a wide toothless bucket, and stripped down to the natural sub-stratum. All machine excavation was undertaken under direct archaeological supervision.

4.1.6 All visible features were marked with spray paint as they were exposed by machine excavation. A Leica Viva Smart Rover Global Navigation Satellite System (GNSS) was used to map all observed remains and set out base lines for planning. No overall 'site survey grid' was set out.

4.1.7 The investigation of archaeological remains was by hand, with cleaning, examination and recording both in plan and in section, where appropriate. Cleaning was restricted to portions of probable and certain archaeological features identified during machine removal of overburden. Investigations followed the normal principals of stratigraphic excavation and were conducted in accordance with the methodology set out in PCA's site manual (PCA

2009).

4.1.8 An adequate proportion of archaeological features were excavated by hand to determine their form and function, where possible. The following sampling policy applied to archaeological features:

- all kilns or other industrial features – 100%
- all short ditches/gullies and other short linear features – 40%, to include any ditch terminals
- all major linear ditches – 20%
- terminal of ditches or other features – 100%
- all stratigraphic relationships (*ie*. intercutting features) – 100%
- pits and postholes – 100%, those over 0.5m – 50%

4.1.9 Sections excavated through archaeological features were located using the Smart Rover GNSS and recorded as appropriate, using a single context recording system utilising *pro forma* context recording sheets. Plans were drawn at 1:20 and sections at 1:10 or 1:20.

4.1.10 A detailed photographic record of the investigations was compiled using SLR cameras (35mm film black and white prints for archive purposes) and by digital photography, illustrating in both detail and general context the principal features and finds discovered. The photographic record also included 'working shots' to illustrate more generally the nature of the archaeological operation mounted. All record photographs included a legible graduated metric scale.

4.1.11 The Smart Rover GNSS was used to establish Temporary Bench Marks (TBMs) on the site. The height of all principal strata and features were calculated relative to Ordnance Datum using the TBMs and indicated on the appropriate plans and sections.

4.2 Post-excavation

4.2.1 The stratigraphic data generated by the project is represented by the written, drawn and photographic records. A total of 283 archaeological contexts were defined during the course of the archaeological investigations (Appendix 2). The contents of the paper and photographic elements of the Site Archive are quantified in Section 6. Post-excavation work involved checking and collating site records, grouping contexts and phasing the stratigraphic data (Appendix 1). The archaeological remains were assigned to seven broad phases of activity. A written summary of the archaeological sequence was then compiled, as described below in Section 5.

4.2.2 The artefactual material recovered during the excavation comprised assemblages of prehistoric struck flint, medieval pottery, daub, slag, an iron knife blade and a quernstone (Appendices 4-6, 9 & 10). A small assemblage of animal bone was also recovered (Appendix 8).

4.2.3 The palaeoenvironmental sampling strategy of the project was to recover bulk samples where appropriate, from well-dated stratified deposits covering the main periods or phases of occupation and the range of feature types represented, with specific reference to the objectives of the excavation. To this end 29 samples were selected for post-excavation processing and assessment for palaeoenvironmental remains (Appendix 7). An assessment report has been produced including a basic quantification of the recovered material and a statement of potential for further analysis and recommendations for such work (see Section 8 in this report). Four samples were submitted for AMS dating. Artefacts and faunal remains recovered during the processing of bulk samples were added to the hand-collected material for assessment.

4.2.4 The complete Site Archive, in this case comprising the written, drawn and photographic records (including all material generated electronically during post-excavation) and the artefactual assemblage, will be packaged for long term curation.

4.2.5 In preparing the Site Archive for deposition, all relevant standards and guidelines documents referenced in the Archaeological Archives Forum guidelines document (Brown 2007) will be adhered to, in particular a well-established United Kingdom Institute for Conservation (UKIC) document (Walker, UKIC 1990) and an IfA publication (CIfA 2014c). The depositional requirements of the body to which the Site Archive will be ultimately transferred will be met in full.

4.2.6 At the time of writing the Site Archive is housed at the Northern Office of PCA, Unit N19a Tursdale Business Park, Durham, DH6 5PG. When complete, the Site Archive will be deposited with the Tyne and Wear Archives and Museums, Arbeia Roman Fort, South Shields, Tyne and Wear, under the site code ERS 16. The Online Access to the Index of Archaeological Investigations (OASIS) reference number for the project is: preconst1-293480.

5. RESULTS: THE ARCHAEOLOGICAL SEQUENCE

During the investigations, separate stratigraphic entities were assigned unique and individual 'context' numbers, which are indicated in the following text as, for example, [100]. The archaeological sequence is described by placing stratigraphic sequences within broad phases, assigned on a site-wide basis in this case. An attempt has been made to add interpretation to the data, and correlate these phases with recognised historical and geological periods.

5.1 Phase 1: Natural Sub-stratum

5.1.1 Phase 1 represents natural geological material that was exposed across the site. Limestone bedrock [383] was observed within deep cut features excavated along the western edge of the site (Areas 1 and 2) and fractured limestone bedrock was observed across the central and western portion of Area 1a.

5.1.2 The limestone bedrock was overlain by a glacial till deposit [102] that was exposed across the entire site. This was of variable composition; friable gravelly sand and firm sandy clay across the western and central parts of the site and friable clayey sand across the eastern part of the site. The maximum recorded height for the natural till deposit was 85.33m AOD at the western extent of the site, this slopping downwards to the north-east where a minimum height of 75.75m AOD was recorded.

5.1.3 It is probable that within areas where no sub-soil was present (Areas 1a, 1 and 2) the upper interface of the superficial glacial till deposit had been subject to truncation by agricultural activity during the medieval and post-medieval periods.

5.2 Phase 2: Undated and Iron Age

5.2.1 The earliest archaeological features encountered at the site comprised the eastern part of a substantial ditched enclosure along the western edge of the site and a sinuous segmented ditch and associated features across the eastern edge of the site (Figure 5).

Ditched Enclosure

5.2.2 Part of the eastern side of a substantial ditched enclosure was exposed for a distance of *c.* 70m along the western edge of the site. These remains comprised at least two phases of ditched enclosure (Groups 1 & 17) both with eastern entrances. The internal area of this enclosure lay beyond the area of excavation to the west.

5.2.3 Six slots were excavated through the ditched enclosures (Figure 5). The table below summarises the dimensions for the enclosure ditch within each slot:

Cut	Section	Phase 2 Groups 1 & 17				*mAOD*	
		Ditch/terminal	*Group*	*Width*	*Depth*	*Highest*	*Lowest*
160	21	Ditch	1	>3.80m	1.62m	83.14	81.48
182	24	Ditch	1	2.35m	1.70m	83.70	82.02
202	31	Ditch	1	3.54m	2.14m	84.36	82.12

245	36	Terminal	1	3.15m	1.66m	84.56	82.75
251	37	Ditch	17	3.50m	0.78m	84.52	83.67
298	58	Terminal	17	3.30m	1.25m	84.77	83.41
304	59	Terminal	1	2.20m	0.73m	84.70	83.94
354	88	Ditch	1	2.94m	1.08m	84.62	83.36

Table 1: Dimensions of enclosure ditch G1 & G17

Ditched Enclosure (Group 17)

5.2.4 The earliest surviving incarnation of the ditched enclosure comprised a NNW-SSE aligned ditch (Group 17), with a rounded terminal to the NNW. This was exposed for a distance of *c.* 10m, truncated to the SSE by a later ditch recut [245] (Group 1) (Figure 5; Plate 2). It had a broad U-shaped profile with a maximum width of 3.50m and was up to 1.25m deep, encountered at maximum and minimum heights of 84.77m AOD and 84.52m AOD, respectively (Figure 7; Sections 37 & 58).

5.2.5 Group 17 ditch was filled by a natural silting depositional event (Group 18) which comprised up to five deposits with various compositions of clay, sand and silt from which no datable artefactual material was recovered.

5.2.6 This ditch probably represents the earliest surviving phase of ditched enclosure on the same alignment as Group 1 ditched enclosure with the NNW rounded terminal [298] probably representing the southern side of an eastern entrance into the enclosure. No traces of the corresponding northern side survived truncation by the later recut of the enclosure ditch (Group 1).

Ditched Enclosure (Group 1)

5.2.7 The Group 1 enclosure ditch truncated the Group 17 ditch and comprised a substantial NNW-SSE aligned ditch that was exposed for a maximum distance of 70m with a *c.* 10m wide eastern entrance in the southern part of the excavation area that was defined by two rounded terminals [304] and [245] (Figure 5; Plates 1, 2 & 5). At the NNW extent of the enclosure the ditch gradually turned to a NE-SW alignment, continuing beyond the western limit of excavation. Six slots were excavated through the ditch and at its widest the ditch was up to 3.80m wide with recorded depths ranging from a minimum of 0.73m to a maximum of 2.14m, encountered at maximum and minimum heights of 84.70m AOD and 83.14m AOD, respectively (Figures 6-9; Sections 21, 24, 31, 36, 59 & 88; Plates 1, 3 & 4).

5.2.8 The profiles within each slot excavated through the Group 1 enclosure ditch had moderately steep to steep sloping sides. Within three of the excavated slots, [160], [183] & [202], the lower portion of the enclosure ditch had been rock-cut into bedrock, encountered within the ditch slots at maximum and minimum depths below ground level of 1.50m, [202], and 0.60m, [160], at heights of 82.54m AOD and 82.54m AOD, respectively. Where the enclosure ditch had been rock-cut, the lower portion of the enclosure ditch had vertical sides and a flat base

measuring up to 0.80m wide by up to 0.58m deep, with this profile resulting from the horizontal and vertical fractured nature of the bedrock.

5.2.9 There is potential that episodic recutting of the Group 1 enclosure ditch had occurred; the identification of recuts will be a focus for further analysis at the publication stage once all relevant dating evidence has been assessed.

5.2.10 The enclosure ditch was filled with two depositional events. The initial depositional event represents the natural silting (Group 2) of the enclosure ditch. Group 2 natural silting deposits were in turn overlain by a further natural silting or slumping deposition event (Group 3). Table 2 below summarises the thicknesses recorded for each natural silting/slumping deposit.

Context No.	Cut No.	Section No.	Phase 2 Groups 2 & 3 Maximum Thickness of Ditch Fills			
			Natural silting (Group1) Natural silting/slumping (Group 2)	*Thicknes*	*mAOD*	
					Highest	*Lowest*
[172]	[160]	21	Natural silting	0.16m	82.78	81.64
[164]	[160]	21	Natural silting/slumping	0.58m	83.14	83.06
[165]	[160]	21	Natural silting/slumping	0.24m	83.06	82.60
[166]	[160]	21	Natural silting/slumping	0.24m	83.16	83.14
[167]	[160]	21	Natural silting/slumping	0.26m	83.16	82.58
[168]	[160]	21	Natural silting/slumping	0.30m	82.98	82.32
[169]	[160]	21	Natural silting/slumping	0.28m	82.48	82.12
[170]	[160]	21	Natural silting/slumping	0.16m	83.00	81.92
[171]	[160]	21	Natural silting/slumping	0.20m	82.58	81.82
[183]	[182]	24	Natural silting	90mm	83.09	
[184]	[182]	24	Natural silting/slumping	0.50m	82.77	82.32
[185]	[182]	24	Natural silting/slumping	0.50m	83.67	82.83
[186]	[182]	24	Natural silting/slumping	0.87m	83.70	83.01
[214]	[202]	24	Natural silting	0.12m	82.26	82.18
[207]	[202]	31	Natural silting/slumping	0.56m	84.36	84.04
[208]	[202]	31	Natural silting/slumping	0.46m	84.12	83.62
[209]	[202]	31	Natural silting/slumping	0.38m	83.90	83.22
[210]	[202]	31	Natural silting/slumping	0.20m	84.08	83.06
[211]	[202]	31	Natural silting/slumping	0.46m	83.40	82.84

[212]	[202]	31	Natural silting/slumping	0.50m	84.04	82.58
[213]	[202]	31	Natural silting/slumping	0.20m	82.62	82.38
[246]	[245]	36	Natural silting	80mm	83.93	
[247]	[245]	36	Natural silting/slumping	0.22m	84.06	83.15
[248]	[245]	36	Natural silting/slumping	0.23m	84.43	83.39
[249]	[245]	36	Natural silting/slumping	0.34m	84.23	83.72
[250]	[245]	36	Natural silting/slumping	0.76m	84.55	84.43
[305]	[304]	59	Natural silting/slumping	0.40m	84.55	84.27
[306]	[304]	59	Natural silting/slumping	0.31m	84.65	84.57
[362]	[354]	88	Natural silting	0.14m	83.60	83.52
[359]	[354]	88	Natural silting/slumping	0.54m	84.64	84.38
[360]	[354]	88	Natural silting/slumping	0.42m	84.64	83.88
[361]	[354]	88	Natural silting/slumping	0.10m	84.34	83.68

Table 2: Dimensions of enclosure ditch fills (Groups 2 and 3)

5.2.11 The natural silting (Group 2) was the basal deposit recorded within five of the slots excavated through the enclosure. The natural silting deposits ([172], [183], [214], [246] & [362]) comprised a single deposit within each slot of various sterile clay, silt and sand compositions and varied from minimum and maximum thicknesses of 0.16m and 80mm, respectively. No natural silting deposit was present in ditch terminus [304].

5.2.12 Group 3 represents natural silting/slumping fills that contained various compositions of clay, silt and sand and had a maximum combined thickness of 2.00m in ditch slot [202]. These fills contained varying quantities of stone inclusions with substantial quantities of medium to large sized unworked sub angular limestone in fills [185], [211] & [360]. It is likely that the enclosure would have had a bank along the inner side of the ditch with comprising upcast material derived from the excavation of the ditch. No evidence of the upcast bank survived with this likely to have been truncated by later agricultural activity. The stone material recorded in fills [185], [211] & [360] may represent the slumping of this upcast bank material into the ditch with the stone material originally derived from the rock-cut element of the enclosure ditch.

5.2.13 A sample of charcoal (quercus sp.) taken from secondary fill [184] of ditch slot cut [182] (Section 24) towards the northern end of the exposed area of ditch was submitted for AMS dating produced a date of 404–231 cal BC (SUERC 75899). A sample of charcoal (prunus sp.) taken from secondary fill [213] of ditch slot cut [202] (Section 31) produced an AMS date of 400–211 cal BC (SUERC 75900). The initial silting, and presumably the original cutting of the enclosure ditch, is therefore dated to the Middle Iron Age.

5.2.14 A small assemblage of finds recovered from these fills included a piece of flint debitage (SF 6) from [164] and two pieces of non-diagnostic, possible metallurgical, slag and animal bone from [207]. The flint was identified as a crudely struck flake; although the flake is typical of the later prehistoric industries and potentially contemporary with the Iron Age ditch, it is considered to be more likely a waste flake from mass reduction or core shaping belong to an earlier prehistoric period and therefore potentially residual (Appendix 6). Only a small assemblage of faunal remains was recovered from the Group 1 ditch with this material comprising seven fragments of cattle bone that was exclusively from [207] (Appendix 8).

5.2.15 Five palaeoenvironmental samples (Samples 32, 34, 49, 50 & 65) were analysed from Group 2 backfill deposits from the enclosure ditch (Group 1) (Appendix 7). Charred plant macrofossils were present within all samples assessed and identified cereals of barley, wheat and oat were identified with a prevalence of barley within the assemblage. Also identified were common arable weeds of sedges (*Carex* sp.) and bedstraw (*Gallium* sp.). All samples produced small quantities of charcoal, with the exception of Sample 34 from ditch fill [184] which produced relatively large quantities of charcoal. The woody taxa identified from the charcoal assemblage included oak and hazel/alder along with lesser quantities of gorse/broom and cherry/blackthorn.

Segmented Ditch (Group 11) and associated features

5.2.16 The earliest feature recorded along the eastern edge of the site was a partially exposed substantial irregular-shaped shallow feature, [340] (Figure 5; Plate 6). It measured at least 4.50m NW-SE by 4.80m NW-SE, continuing north-east beyond the limit of excavation, and was up to 0.24m deep (Figure 8; Section 81). Its *c*. 80mm thick basal fill comprised relatively sterile friable clayey sand, [339], which probably represents natural silting. This was overlain by *c*. 0.16m thick friable clayey sand backfill, [338], which contained frequent quantities of burnt stone and charcoal.

5.2.17 This feature is likely to represent a refuse pit with the burnt stone and charcoal possibly derived from hearths or some other industrial activity in the vicinity as there was no sign of burning in the natural sub-stratum in the sides of the feature. Although no datable artefactual material was recovered from any of its fills, it was truncated by ditch [317] and therefore predates this.

5.2.18 A sinuous roughly NW-SE aligned segmented ditch (Group 11) extended across the eastern edge of the site for a maximum distance of 83m (Figure 5; Plate 7). Initially the south-eastern part of the ditch was thought to be continuous with the segments only evident once fully excavated, this likely to be the result of natural erosion. Fourteen ditch segments were identified across its length with each segment differing in length and profile (Figures 8 & 9; Sections 60-71 & 90-98; Plates 8, 9 & 10). Where complete, the ditch segments had maximum and minimum lengths of 8.56m and 4.40m, respectively. The dimensions of each ditch section are summarised in Table 3 below.

Section No.	Cut No.	Width	Depth	mAOD	
				Top	*Bottom*
60	[239]	0.70m	0.27m	76.13	75.82
61	[241]	0.37m	0.27m	76.23	76.03
62	[243]	0.43m	0.36m	76.22	75.83
63	[308]	0.38m	0.17m	76.16	75.85
64	[310]	0.50m	0.21m	76.12	75.89
65	[312]	0.56m	0.12m	76.14	75.89
66	[314]	0.86m	0.22m	76.13	75.86
67	[289]	0.58m	0.12m	77.80	77.41
68	[291]	0.79m	0.39m	77.69	77.27
69 & 97	[293]	1.12m	0.41m	77.45	76.92
70	[295]	0.57m	0.14m	77.03	76.80
71	[297]	0.37m	0.20m	76.61	76.32
90	[367]	1.03m	0.12m	77.63	77.43
91	[365]	0.97m	0.17m	77.56	77.34
92	[371]	0.42m	0.23m	76.79	76.53
93	[369]	0.76m	90mm	76.89	76.63
94	[373]	0.48m	0.16m	76.04	76.82
95	[375]	0.47m	0.17m	79.10	76.82
96	[377]	0.64m	0.25m	77.24	76.94
98	[379]	0.52m	0.21m	77.68	77.44

Table 3: Dimensions of Ditch (Group 11)

5.2.19 The segmented ditch was filled by a single natural silting deposition event (Group 12) which comprised sterile sandy silt and sandy clay. A single piece of flint (SF 4) recovered from fill [292] of ditch [293] was identified as a prismatic blade and is likely to be Mesolithic or Early Neolithic in date (Appendix 6). It is unclear however if this flint blade is residual to the context. Only a small assemblage of faunal remains was recovered exclusively from the northern ditch segment [241] fill [240] and contained five fragments of horse bone (Appendix 8). Two samples of charred material recovered from segments of the ditch were submitted for AMS dating charcoal (Leguminosae) from fill [292] of ditch [293] (section 69) and charcoal (cf. Corylus avellana) from fill [311] of ditch [312] (Section 65). Both produced dates in the early medieval period: 895–1019 cal AD (SUERC 75904) and 771–963 cal AD (SUERC 75905), respectively. The segmented ditch is not however considered likely to date

from the medieval period due to its form and its stratigraphic position beneath a colluvial deposit and sub soil and it is possible that the medieval material was introduced into these shallow ditch segments feature though ploughing.

5.2.20 Three palaeoenvironmental samples (Samples 98, 106 & 107) were analysed from the fill of the segmented ditch; cereals of barley, wheat and oat were identified with a prevalence of barley in the assemblage (Appendix 7). Of note is that the palaeoenvironmental remains recovered from the segmented ditch broadly reflects the assemblage recovered from the Group 1 enclosure ditch. Also recovered were arable weeds including the common knotgrass (*Polygonum aviculare*), associated with the cultivation of dry sandy soils, along with campions (*Silene* sp.). Charcoal recovered from these deposits contained woody taxa include oak and hazel/alder and relatively small quantities of gorse/broom and unidentified species of the *Maloideae group*. However, given the medieval dates recovered from two samples of charred material submitted for radiocarbon dating, it cannot be certain if all of this material is contemporary with the infilling of the ditch of if a component has been introduced through ploughing and bioturbation.

5.2.21 Truncating the upper fill of possible refuse pit [340 was a NNW-SSE aligned ditch, [317], partially exposed for a distance of 9.26m (Figure 5). It had a U-shaped profile up to 0.72m wide by 0.31m deep and was encountered at maximum and minimum heights at 75.65m AOD and 75.70m AOD (Figure 8; Section 72 & 81). Its single sterile sandy silt fill, [316], was similar to that of the segmented ditch and also represents natural silting. Although no datable material was recovered from this ditch, it was located immediately to the north of the NNW terminal of the segmented ditch (Group 11) and may represents a continuation of this extensive feature to the NNW.

5.2.22 Two ditches set at approximate right-angles, [350] and Group 16 ([344] & [346]), were partially exposed to the north-west of the Group 11 segmented ditch (Figure 5). The south-easternmost of these ditches, [350], was aligned NE-SW and exposed for a distance of 3.14m with a shallow rounded terminal to the south-west. It had a U-shaped profile and was up to 0.46m wide by 40mm deep (Figure 8; Section 86). Located *c.* 5m to the north-west of ditch [350] a NNW-SSE aligned ditch (Group 16) was exposed for a distance of 12m with a rounded terminal to the SSE. It had a shallow U-shaped profile and was up to 0.69m wide and 0.23m deep (Figure 8; Section 83 & 84). Both ditches were filled by sterile sandy silt, [349] and Group 17, respectively, similar to the fills of the segmented ditch, probably representing natural silting. Ditches [350] and Group 17 may represent the south-western corner of an enclosure with a possible entrance formed by the two terminals. Although no datable material was recovered from any of the fills based on the similarities of the fills composition with all other ditch features recorded along the eastern edge of the site a similar prehistoric date or earlier is likely.

5.2.23 A group of six postholes, [319], [321], [323], [325], [327] & [329], and a short linear feature, [331], were recorded immediately to the south-east of the NNW part of the segmented ditch (Group 11) (Figure 5) and probably represent the surviving elements of structures.

5.2.24 The six postholes, [319], [321], [323], [325], [327] & [329], were in two distinct groups including a square arrangement formed by postholes [323], [325], [327] & [329] and two postholes, [319] & [321], located *c.* 3m to the north-west. The postholes were either circular or oval-shaped with the largest circular posthole measuring *c.* 0.55m in diameter and the largest oval-shaped posthole measured 0.66m north-south by 0.31m east-west. The postholes had a similar U-shaped profile and had a maximum depth of 0.19m, [321] (Figure 8; Sections 73-78). It is uncertain if the separate groups of postholes represent the remains of two separate structures or a single larger structure. All postholes contained similar sandy silt fills, [318], [320], [322], [324], [326] & [328], respectively, from which no datable finds were recovered.

5.2.25 A NE-SW aligned linear feature, [331], located *c.* 3m south-west of the segmented ditch measured 2.50m long. It had a shallow U-shaped profile up to 0.47m wide and was 0.12m deep, encountered at a height of *c.* 76.60m AOD (Figure 8; Section 79). Its single sandy silty fill, [330], contained no datable material. The function of this feature is uncertain and may represent part of a drainage gully or alternatively a timber slot.

5.2.26 Although no datable material was recovered from the fills of the postholes, [319], [321], [323], [325], [327] & [329], and the linear feature, [330], they were similar in composition to that of the segmented ditch (Group 11) and are probably of a contemporary prehistoric date.

5.3 Phase 3: Colluvium

5.3.1 A deposit of firm sandy silt colluvium, [380], was only present within the south-eastern part of the site, extending for a maximum distance of *c.* 100m NW-SE by 57m NE-SW. At the south-eastern corner of the site, the colluvium was up to 0.59m thick becoming thinner towards higher elevations to the west and north-west of the site and was encountered at maximum and minimum heights of 78.77m AOD and 75.93m AOD, respectively.

5.3.2 Although no datable material was recovered from this deposit, it directly overlay Phase 2 prehistoric activity and was truncated by Phase 6 undated, but probably medieval, furrows [104].

5.4 Phase 4: Medieval

5.4.1 A small portion of a north-south aligned ditch, [230], was recorded at the western edge of the site (Figure 10; Plates 11 & 12). Truncated by the medieval enclosure ditch (Group 4) the surviving portion of the ditch, [230], measured 6.50m long. It had a broad U-shaped profile and was up to 1.30m wide and up to 0.38m deep, encountered at a height of *c.* 85.23m AOD. The definitive function of this ditch is impossible to determine due to substantial truncation, however it may represent a surviving element of an earlier medieval ditched enclosure. No datable material was recovered from its single sandy silt fill, [237], and it could potentially date to the prehistoric period.

Ditched Enclosure

5.4.2 Truncating the Phase 2 ditched enclosure, was the eastern side of a later substantial ditched enclosure (Group 4) which was recorded along the western edge of the site for a distance of *c.* 74m NNW-SSE and was exposed for a maximum distance of 7.50m ENE-WSW (Figure 10; Plates 3, 4, 11, 12 & 13). At its NNW and SSE extents the ditched enclosure turned to a WSW direction and presumably formed a square or rectangular enclosure, with the internal area located beyond the area of excavation to the west (Plates 11 & 14). Although no evidence for an upcast bank was identified it is likely to have extended along the internal side of the enclosure ditch with this probably truncated by later post-medieval agricultural activity.

5.4.3 Six slots were excavated through the ditch which was up to 4.04m wide and up to 1.37m deep and was encountered at maximum and minimum heights of 85.34m AOD and 82.73m AOD, respectively (Figures 15, 16 & 18-20; Sections 13, 21, 24, 31, 57, 56, 88 & 89). The profiles of the ditch varied across its length with the eastern, northern and southern elements of the enclosure having maximum and minimum widths of 3.44m, recorded in slots [140] & [353], and 2.66m, recorded in ditch slots [159] & [187], respectively, and a maximum recorded depth of 1.40m in ditch slot [140]. At these locations the ditch had moderately shallow to moderately steep sides that tapered to a broad concave base. At the location of the northern and southern corners of the enclosure the ditch widened and was up to 5.00m wide at the northern corner by up to 1.40m deep. At the northern corner of the enclosure the

lower portion of the ditch was rockcut with the limestone bedrock encountered at maximum and minimum depths below the ground level of 0.10m and 0.80m respectively. At this location, the base of the ditch where it was cut through solid limestone bedrock had vertical sides up to 0.90m wide and 0.55m deep with this profile the result of the fractured nature of the solid bedrock.

5.4.4 The ditch was filled with two depositional events including basal natural silting deposits (Group 5) that in turn were overlain by deliberate backfill deposits (Group 6). Table 4 below summarises the maximum combined thicknesses recorded for the natural silting and backfill deposits in each slot excavated.

Cut No.	Context No.	Section No.	Phase 4 Groups 5 & 6 Maximum Thickness of Ditch Fills			
			Natural silting (Group5) / *Backfill (Group 6)*	*Thicknes*	*mAOD*	
					Highest	*Lowest*
[140]	[363]	13	Natural silting	0.26m	81.81	81.44
[140]	[137], [138], [139]	13	Backfill	1.25m	82.73	82.55
[159]	[163]	21	Natural silting	0.18m	82.24	82.14
[159]	[161], [162]	21	Backfill	0.82m	83.04	82.90
[187]	[188], [189]	24	Backfill	0.94m	83.71	83.57
[203]	[204], [205], [206]	31	Backfill	1.10m	84.52	84.34
[229]	[235], [236]	56	Natural silting	0.10m	84.22	83.87
[229]	[231], [232], [233], [234]	56	Backfill	0.60m	85.34	84.87
[353]	[358]	88	Natural Silting	0.18m	84.04	83.82
[353]	[355], [356], [357]	88	Backfill	0.74m	84.95	84.64

Table 4: Dimensions of enclosure ditch fills (Groups 5 & 6)

5.4.5 The natural silting (Group 5) was the basal deposit recorded within four of the slots excavated. These natural silting deposits comprised a single fill in slots [140], [159], [353] and two fills in slot [229] of sterile sand and silty sand and had a maximum combined thickness of 0.26m thick from slot [140]. No datable material was recovered from any of the natural silting deposits.

5.4.6 Backfill deposits (Group 6) were recorded in all six slots excavated and comprised various compositions of clay, silt and sand that had a maximum combined thickness of 1.25m in slot [140]. A small assemblage of finds was recovered from backfilling deposits including

medieval pottery, fired clay and an individual find of an undatable flint flake (SF 5; Appendix 6). Twenty-five sherds of pottery were recovered from backfills, [137], [231] and [234], dating to the 12th to early 14th century (Appendix 4). Six fragments of fired clay were recovered from backfills [161] and [231], however these were fragmentary and non-diagnostic (Appendix 5).

5.4.7 A small assemblage of faunal remains recovered from backfill deposits [231] and [234] contained a prevalence of cattle bones with lesser quantities of pig and equid bone (Appendix 8)

5.4.8 Three palaeoenvironmental samples (Samples 20, 45 & 94) analysed from backfill deposits [139], [205] & [234], respectively, contained cereal remains of free-threshing wheat, barley, oat and rye (Appendix 7). Also recovered were a range of arable weeds including stinking mayweed, nipplewort, knotgrass, fat hen, knotweed, docks, small grasses and legumes. The charcoal assemblages recovered from the ditch backfill was variable in size and preservation however where identification was possible these were generally dominated by oak along with smaller quantities of hazel and alder.

Enclosures

5.4.9 Two shallow NE-SW aligned ditches (Groups 7 and 9) extended across the central portion of the site (Figure 10). These probably represent the surviving elements of boundary ditches associated with a larger system of enclosures. Due to the poor survival of these remains the dimensions of the enclosures could not be established. The two parallel ditches (Group 7 and the NE-SW element of Group 9) were 20m apart with this being the only dimension recorded, assuming that they were contemporary. It is possible that specific areas of activity can be identified with three of the corn-drying kilns located within the possible enclosure formed by Group 9 and Group 7 ditches and pits and posthole located to the south of Group 9 ditch. However due to the poor survival of the boundary ditches any specific areas of activity could not be conclusively established; this will be a focus for the further analysis and publication phase of work.

5.4.10 The northernmost ditch (Group 7) was exposed for a distance of *c*. 70m, continuing beyond the excavated area to the west, and truncated to the east by one of the archaeological evaluation trenches with no evidence of this ditch extending to the east beyond this. Six slots were excavated through the ditch; all had similar U-shaped profiles and measured up to 1.72m wide by up to 0.41m deep (Figures 15, 16, 19, 20; Sections 6, 8, 10, 12, 16 & 87). It was encountered at a maximum height of 82.13m AOD at its south-western extent, this extending north-eastwards down the slope where it was recorded at a minimum height of 78.15m AOD.

5.4.11 The southernmost ditch (Group 9) comprised a NE-SW aligned element that measured *c*. 30m long and at the north-eastern extent of this a NW-SE aligned element extended to a south-eastern direction and measured *c*. 10m long. Both Group 9 ditch elements had a

shallow U-shaped profile and measured up to 1.00m wide by up to 0.13m deep, encountered at maximum and minimum heights of 81.99m and 80.00m AOD, respectively (Figures 16 & 18; Sections 17-20 & 47). Table 5 below summarises the dimensions for Group 7 and 9 ditches.

Cut No.	Fill No.	Section No.	Group No.	Phase 4 Groups 7 & 9 Dimensions			
				Width	*Depth*	*mAOD*	
						Highest	*Lowest*
[116]	[115]	6	7	1.72m	0.41m	82.13	81.67
[120]	[119]	8	7	1.30m	0.35m	81.21	80.84
[125]	[124]	10	7	1.50m	0.20m	80.03	79.76
[136]	[135]	12	7	1.10m	0.27m	79.42	79.15
[148]	[147]	16	7	0.77m	0.28m	78.94	78.65
[351]	[352]	87	7	1.00m	0.30m	78.15	77.85
[150]	[149]	17	9	1.00m	0.10m	81.99	81.80
[152]	[151]	18	9	0.60m	0.10m	81.06	80.94
[154]	[153]	19	9	0.90m	0.13m	80.00	79.97
[156]	[155]	20	9	0.62m	0.10m	80.09	79.96
[276]	[275]	47	9	0.50m	0.12m	80.49	80.36

Table 5: Dimensions of Group 7 & 9 ditches

5.4.12 Both boundary ditches (Groups 7 and 9) contained a single sandy silt fill (Groups 8 & 10, respectively) from which a small assemblage of finds were recovered including a single sherd of 14th-century pottery from fill [115] and two pieces of slag from fill [119]. Although the slag recovered was relatively large in size and probably relates to iron production, it is non-diagnostic of a specific production process.

5.4.13 A single palaeoenvironmental sample from the Group 7 ditch backfill [115] (Sample 6) was analysed and this produced cereal remains of rounded wheat grain as well as indeterminate grains along with only a small quantity of charcoal of indeterminate taxa (Appendix 7).

Corn-Drying Kilns [129], [141], [158] & [315]

5.4.14 Four corn-drying kilns [129], [141], [158] & [315], were recorded across the western half of the site (Figure 10). Each corn-drying kiln had similar pear-shaped construction cuts however their sizes, methods of construction and construction material differed considerably. Three of the corn-drying kilns, [129], [141] & [158], were located within the possible enclosure formed by two boundary ditches (Groups 7 & 9), however due to their poor survival and lack of datable artefactual material from the ditches it is unclear if the enclosures are contemporary. The three corn-drying kilns, [129], [141] & [158], were located

within close proximity to each other with corn-drying kiln [315] located *c.* 50m to the south-east of corn-drying kiln [141].

5.4.15 Palaeoenvironmental samples were taken from the basal deposits of each corn-drying kiln along with selected backfill deposits. Cereals of barley, wheat and oat were identified indicating that arable multi-cropping was practised (Appendix 7). Hazelnut (*Corylus avellana*) shell fragments were also recovered from all corn-drying kilns, with the exception of [158], along with a relatively large quantity of cultivated legumes (*Vicia*/ *Lathyrus*/ *Pisum*) from corn-drying kiln [141], this possibly indicating a diversification of diet. It is possible however that the hazelnut could have been used as a fuel source. Various arable weeds were also present within the majority of the corn-drying kilns indicating that there was both cultivation of dry sandy soils and the expansion of cultivation into heavy clay soils. Eight corn drying kiln samples produced charcoal, mostly oak, hazel/alder and alder with gorse/broom, Maloideae and cherry/blackthorn occurring much less commonly.

Corn-Drying Kiln [129]

5.4.16 Corn-drying kiln [129] was located *c.* 3m to the north-east of the NNE corner of the medieval ditched enclosure (Group 4). It comprised a sub-oval shaped stone-lined bowl, [179], built within a narrow construction cut, [129], with a flue located to the SSE and had overall dimensions of 4.86m NNW-SSE by up to 2.60m ENE-WSW (Figure 10 & 11; Plate 15). The bowl measured *c.* 3m NNW-SSE by *c.* 2.60m ENE-WSW and was up to 0.95m deep and the flue measured *c.* 2.20m NNW-SSE by *c.* 1.90m wide and was up to 0.40m deep (Figure 16; Section 23). The flue itself sloped down from the south where a maximum height of 81.78m AOD was recorded to a minimum height of 80.60m to the north at the interface of the flue and bowl. The vertical stone wall lining the bowl, [178], comprised up to ten courses of roughly hewn limestone blocks (maximum 360mm x 260mm x 50mm) bonded by firm yellow clay and had an internal dimension of *c.* 1.94m in diameter. No built stone surface was present within the bowl with the base formed mostly by the natural clay with limestone bedrock at the interface of the flue and bowl.

5.4.17 The stone-lining of the corn-drying kiln wall had a pinkish hue and the natural clay and bedrock forming the base of the bowl had a pinkish hue and was blackened indicating that these areas had been exposed to high temperatures. No heat-affected stone was observed within the flue structure.

5.4.18 Two sandy silt fills, [132] and [128], up to 0.12m thick were the basal deposits recorded within the bowl and flue, respectively (Figure 16; Section 23; Plate 16). Both deposits contained relatively high quantities of charcoal that may represent the debris from the last use of the corn-drying kiln. Palaeoenvironmental samples assessed from each of the deposits (Samples 41 & 42) contained barley, wheat and oat (Appendix 7). The presence of bead wheat (*Triticum aestivum*) rachis suggests the wheat grain was of the free-threshing variety. Also identified were small quantities of hulled grains of wheat and barley and rye (*Secale cereal*) grains.

5.4.19 Four deposits, [131], [130], [127] & [126], overlay the basal deposits, [132] and [128], and consisted of various compositions of sand, silt and clay with a combined maximum thickness of 0.44m (Plate 16). All four deposits contained varying quantities of limestone rubble that was probably derived from the demolition or collapse of the super-structure of the oven. Backfill deposits [131] and [130] contained relatively high quantities of limestone rubble with this probably derived from the stone-lining of the bowl. Very little artefactual material was recovered from the backfill deposits with only two fragments of cattle bone recovered from backfill [126].

5.4.20 A single palaeoenvironmental sample was assessed from the corn-drying kiln demolition backfill deposit [131] (Sample 40). Barley, wheat and oat were identified along with rye (*Secale cereal*) grains, with this assemblage similar in composition to that of cereals identified in the corn-drying kilns basal deposits (Appendix 7).

5.4.21 Although no datable artefactual material was recovered from any of this corn-drying kilns backfill deposits it is likely to be broadly contemporary with other corn-drying kilns which produced pottery dating to the 12th to 13th century.

Corn-Drying Kiln [158]

5.4.22 A pear-shaped corn-drying kiln [158], located *c*. 30m north-east of corn-drying kiln [129], comprised a *c*. 3.80m diameter circular bowl with vertical to near vertical sides up to 1.27m deep, encountered at *c*. 78.06m AOD. The flue was located to the south-west of the bowl and measured *c*. 1.90m NE-SW by up to 2.30m wide by up to 0.96m deep (overall dimensions 5.46m NE-SW by up to 3.80m NW-SE), this sloping downwards from the south where a maximum height of 79.50m AOD was recorded to a minimum recorded height of 78.06m AOD at the interface of the bowl and the flue (Figure 10 & 12; Plate 18).

5.4.23 Truncating the limestone bedrock, [383], were 25 uniformly spaced stakeholes *c*. 0.30m apart (*c*. 80mm diameter by up to 0.10m deep) and two postholes (*c*. 0.21m diameter by up to 0.28m deep) [195] situated around the edge of the bowl (Plate 18). The stakeholes would have housed vertical stakes probably tapering to a dome and strengthened by horizontal withies and covered internally and externally by clay. The larger postholes would have housed more substantial timber posts forming the entrance to the flue.

5.4.24 A sandy silt deposit [194], was observed only around the sides of the corn-drying kiln up to 0.80m high and it may represent packing material associated with the wattle and daub structure. This in turn was overlain by *c*. 0.11m thick compact clay, [197], measuring c. 2.36m in diameter, with this material representing the clay lining surviving at the base of the bowl. Within the bowl near the location of the flue entrance a portion of the clay base measuring *c*. 1.60m NW-SE by up to 0.80m NE-SW was observed to have a pinkish hue and was blackened indicating that this area had been exposed to extremely high temperatures with the underlying limestone bedrock also a pinkish hue.

5.4.25 The clay surface, [197], was overlain by five backfill deposits, [190], [191], [192] & [193], that comprised various compositions of sand, silt and clay and had a maximum combined thickness of 1.24m (Plate 19). The uppermost backfill, [190], contained relatively high quantities of medium sized roughly hewn and unworked limestone blocks (maximum 300mm x 200mm x 100mm) and large unworked limestone blocks (maximum 780mm x 400mm x 280mm). This limestone probably represents refuse material deposited once the corn-drying kiln was abandoned with this material unlikely to be associated with the corn-drying kiln itself.

5.4.26 A small assemblage of finds was recovered from backfill deposit [191] including two sherds of pottery dating to the 12th century and six fragments of fired clay. The fired clay probably formed part of the lining of the corn-drying kiln (Appendix 5). Also recovered was a prismatic flint blade (SF 3) of Mesolithic or Early Neolithic date from backfill [192] that is certainly residual in context (Appendix 6). Faunal remains were only recovered from backfill [191] and comprised seventeen fragments from a single cattle mandible (Appendix 8).

5.4.27 Also recovered from backfill [191] was a single fragment of slag along with a fragment of slagged clay, probably from the lining of the kiln (Appendix 9). The morphology of the slag has similarities to that of coal-derived fuel ash slag therefore it is tentatively suggested that coal or possibly coke may have been used as a fuel in the corn-drying kiln.

5.4.28 Palaeoenvironmental samples (60, 61 & 62) were taken from backfills, [191], [192] and [193], from which cereals of barley, wheat and oat was identified including hulled grains of wheat and barley and also rye (*Secale cereal*) grains (Appendix 7).

Corn-Drying Kiln [141]

5.4.29 Located *c*. 5m south of corn-drying kiln [158] was a similarly constructed corn-drying kiln [141]. Pear-shaped in plan, the bowl had vertical to near vertical sides and measured *c*. 3.30m in diameter by up to 1.05m deep, the base of the bowls flue encountered at a height of c. 79.09m AOD. The flue was located to the south-east and measured 2.10m NW-SE by 1.80m wide and was up to 0.70m deep (overall dimensions of 5.34m NW-SE by up to 3.30m NE-SW) (Figures 10 & 13; Plate 22). The flue sloped downwards from the south-east where it was recorded at a maximum height of 79.89m AOD to a minimum recorded height of 79.10m AOD to the north-west at the interface of the flue and bowl.

5.4.30 Truncating the limestone bedrock were 21 stakeholes [196] uniformly spaced around the edge of the bowl and two postholes (up to 0.18m diameter by up to 0.25m deep) located at the interface of the bowl and the flue (Plates 22 & 23). The stakeholes (*c*. 0.10m diameter by up to 0.10m deep) would have housed vertical stakes forming part of the superstructure of the oven.

5.4.31 Located along the south-western side of the corn-drying kiln's bowl was part of a limestone built wall-lining, [174], for a maximum length of 1.40m. The wall comprised a single course of roughly hewn limestone blocks (maximum 300mm x 200mm x 180mm) and was up to

0.30m wide by up to 0.25m high. This wall potentially represents a surviving element of an earlier stone built lining or alternatively may represent packing material forming a repair of the wattle and daub lining.

5.4.32 The base of the kilns bowl was lined by a *c*. 30mm thick deposit of firm clay, [180], and directly overlay masonry [174] (Plates 21, 22, 23). The clay lining was also present along the edge of the kilns bowl and survived to a maximum height of 0.48m (Figure 17; Sections 29 & 30). The clay lining itself was a light yellow colour with the exception of an area measuring *c*. 150m NE-SW by 1.30m NW-SE located near the entrance of the flue where the clay was a pinkish red colour and blackened where it had been exposed to extremely high temperatures (Figure 13). The clay lining present along the sides of the bowl was observed to have a pinkish hue with this also representing its exposure to high temperatures (Plate 15).

5.4.33 Two deposits, [201] and [177], represent the remains associated with the last use of the corn-drying kiln (Figure 17; Sections 29 & 30). The earliest of these deposits was located within the flue and comprised sandy silt, [201], measuring 2.31m NW-SE by 0.92m NE-SW and was up to 0.17m thick. It contained patches of clay and burnt material throughout and may represent material raked-out from the bowl. This was directly overlain by *c*. 0.11m thick deposit of charred grains, [177], measuring 3.15m NW-SE by 2.62m NE-SW within the base of the corn-drying kiln bowl (Plate 15). The deposit of charred grain was 100% sampled (Sample 87) and a sub-sample sent for analysis. The sample contained a pure assemblage of oat grains and a number of floret bases were identified confirming the presence of cultivated oat (Avena sativa). The charred grains left within the corn-drying kiln suggests that the last firing had failed catastrophically resulting in the burning down of the kiln's superstructure, this accounting for the substantial quantities of daub contained in the overlying fill [173], and the burnt grain left in situ.

5.4.34 A deposit exclusively of daub fragments, [173], directly overlay the deposit of charred grain, [177], and measured 3.25m NW-SE by 2.75m NE-SW and was up to 0.40m thick. This deposit probably represents the collapsed wattle and daub super structure of the corn-drying kiln and a sample of 65 daub fragments were retained (Appendix 5). Numerous examples of daub had withy impressions from the wattle structure.

5.4.35 Four deposits, [181], [198], [199] & [200], with a combined maximum thickness of 0.62m filled the corn-drying kiln and comprised various compositions of sand, silt and clay (Figure 17; Sections 29 & 30; Plate 15). Finds recovered from the kilns fills [199] & [200] include a small assemblage of 12th- to 13th-century pottery and three pieces of daub that probably derived from the collapsed super structure.

5.4.36 A palaeoenvironmental sample (Sample 85) taken deposit [198] produced barley, wheat and oat with free-threshing wheat dominant within the assemblage (Appendix 7). A single rachis of rye was also identified however no grains were present from this cereal. Also identified was a single flax (*Linum* sp.) seed that could be an indicator of textile production. It is

uncertain however if this flax is the cultivated variety and it therefore could represent a food or oil crop.

Corn-Drying kiln [315]

5.4.37 Corn-drying kiln [315] was recorded within the southern part of the site and had a pear-shaped construction cut measuring 3.90m NE-SW by up to 2.70m NW-SE (Figures 10 & 14; Plate 24 & 25). The bowl of the corn-drying kiln was stepped and measured *c*. 2.70m in diameter with a slightly off-centre *c*. 1.10m circular depression c. 0.25m deep. The kiln had a maximum depth of 0.90m and the maximum and minimum heights for the bowl were 80.12m AOD and 79.85m AOD, respectively. The flue was located to the south-west and measured 1.80m NE-SW by up to 1.70m wide and was up to 0.60m deep. The flue differed from the other three examples in that it was stepped and sloped down from south-west where a maximum height of 81.01m OAD was recorded and a minimum height of 82.42m AOD was recorded to the north-west.

5.4.38 The basal fill of the corn-drying kiln comprised *c*. 30mm thick black ashy silt, [337], that was contained within the bowl's central depression and may represent the debris from the kilns last use (Plate 24). A palaeoenvironmental sample (Sample 117) taken from this deposit was sent for analysis and contained small quantities of environmental material of indeterminate cereal grains (Appendix 7).

5.4.39 Five backfill deposits, [332], [333], [334], [335] & [336], comprised various compositions of silt and sand and had a maximum combined thickness of 0.94m (Plate 24). Of note were sand backfills [333] and [334] with this material probably derived from some other industrial activity such as metal working which may have taken place within the near vicinity of this feature.

5.4.40 A small assemblage of finds was recovered from the backfills including pottery, slag, fired clay and bone. A total of fourteen sherds of pottery were recovered from the upper backfill deposits, [332] and [333], providing a 12th-century date (Appendix 4). Nine fragments of fired clay were recovered from backfill [333] probably derived from the kiln's super-structure (Appendix 5). Faunal remains recovered from backfill deposits, [332], [333] & [334], contained a total of fifty fragments of bone with a prevalence of equid bone along with cattle and sheep/goat bone (Appendix 8). Two pieces of slag were recovered from backfill [333] (Sample 114) which were not diagnostic of a specific process, however do represent evidence of metal production (Appendix 9).

5.4.41 Two palaeoenvironmental samples (Samples 113 & 114) were taken from backfill deposits [332] and [333] from which cereals of barley, wheat and oat was identified along with rye (Secale cereal) grain (Appendix 7).

5.4.42 Although pottery dating to the 12th century was only recovered from the uppermost two backfill deposits of the feature, they do suggest a broadly contemporary date for construction. The construction method for this feature differed considerably to that of corn-

drying kilns [141] and [158], in that no stakeholes or postholes were present around the edge of the bowl that would have formed a wattle and daub super-structure. Also the stepped bowl was only present in this feature suggesting that an alternative function such as a furnace associated with metal working may be possible.

Hearths [121], [134], [143], [218], [342] & [348]

5.4.43 Six hearths, [121], [134], [143], [218], [342] & [348], were recorded across the site (Figure 10; Plate 26). Hearths [342] & [348] were located within the northern extent of the site, hearths [121], [143] & [134] were located within the near vicinity of the corn-drying kilns at the western part of the site and hearth [218] located within the southernmost internal area of the medieval enclosure (Group 4). The hearths were generally oval shaped with near vertical sides and flat bases. The maximum dimensions were 1.70m long by 1.20m wide and up to 0.46m deep. Table 6 below summarises the dimensions of each hearth.

Cut No.	Fill No.	Section No.	Phase 4 Hearth Dimensions				
			Length	*Width*	*Depth*	*mAOD*	
						Highest	*Lowest*
[121]	[122], [123]	9	1.45m	0.94m	0.18m	81.40	81.21
[134]	[133]		1.50m	0.80m	50mm	82.47	82.29
[143]	[142], [144]	14	1.70m	1.20m	0.23m	81.13	80.91
[218]	[215], [216], [217]	32	1.60m	0.94m	0.46m	85.19	84.74
[342]	[341]	82	0.99m	0.70m	0.20m	77.49	77.28
[348]	[347]	85	1.72m	1.03m	0.15m	77.23	77.03

Table 6: Dimensions of hearths.

5.4.44 The fills of the hearths comprised various compositions of silt and sand with each fill containing frequent quantities of burnt material including charcoal and burnt stones representing debris from its use (Figures 15, 18 & 19: Sections 9, 14, 32, 82 & 65). The exception was the uppermost fill, [215], of hearth [218] which contained low quantities of burnt material and probably represents a refuse backfill deposit.

5.4.45 Five palaeoenvironmental samples (Samples 10, 23, 52, 112 & 119) taken from the hearths primary fills [123], [144], [217], [341] and [347], respectively, were sent for analysis (Appendix 7). Relatively small quantities of charred plant macrofossils were recovered from these deposits. The majority of cereal grains were indeterminate however the presence of hulled barley, wheat and oat were noted along with the possible presence of rye in hearth [218] (Sample 52). Charcoal remains recovered from the hearths included quantities of oak and several pieces of definite hazel and alder.

5.4.46 Also recovered from the backfill of the hearths was limited evidence of metal production at the site. A single fragment of coke fuel or partially burnt coal was recovered from backfill [123] (Sample 10) of hearth [121]. If this can be identified as deliberately manufactured coke it would represent a very early example of the use of such fuel in Britain in the medieval period. Further evidence of metal production was recovered from the backfills, [144] and [341] (Samples 23 & 122), from hearths [143] and [342], respectively, including a small fragment of roasted iron stone, a small fragment of undiagnostic slag and three small fragments of possibly iron nails.

5.4.47 The hearths have tentatively been attributed to medieval period activity, however no datable material was recovered from any of their fills therefore could be earlier, potentially prehistoric, in date and further analysis of the material from the palaeoenvironmental samples recovered including charcoal for radiocarbon dating could potentially provide a date for these.

Discrete Features

5.4.48 Twelve postholes, [106], [108], [222], [256], [258], [260], [262], [264], [266], [270], [280] & [284], and sixteen pits, [110], [112], [114], [118], [146], [176], [220], [224], [226], [228], [268], [272], [274], [278], [282] & [286], were recorded across the western portion of the site (Figure 10).

5.4.49 The postholes, [106], [108], [222], [256], [258], [260], [262], [264], [266], [270], [280] & [284], were generally circular or sub-circular in shape and had a U-shaped profile of which the largest [266] measured 1.00m by 0.72m with maximum and minimum depths recorded for all postholes of 0.37m and 40mm, respectively (Figures 15, 18 & 19; Sections 1, 2, 35, 38-43, 45, 50 & 52). Each posthole contained a single sandy silt fill, [105], [107], [221], [255], [257], [259], [261], [263], [265], [269], [279] & [283], respectively, from which only three sherds of pottery were recovered from posthole [106]. The pottery was a coarse black fabric that is not consistent with medieval wares and therefore could potentially be Iron Age in date. Posthole [106] and features within its near vicinity located at the north-western part of the site including postholes [108], [112], [114] and pit [110] have therefore tentatively been attributed to Phase 4 medieval activity, with further analysis of the pottery recovered from pit [106] required to securely date these features.

5.4.50 Sixteen pits, [110], [112], [114], [118], [146], [176], [220], [224], [226], [228], [268], [272], [274], [278], [282] & [286], were recorded across the site and were circular, sub-circular or oval shaped. The circular and sub-circular pits had maximum dimensions of 1.96m by 1.70m (Pit 110) and the oval pits had maximum dimensions of 1.94m by 1.54m (Pit 220). The profiles of the pits varied from U-shaped to shallow U-shaped and had maximum and minimum depths of 0.45m and 90mm, respectively (Figures 15, 16, 18, 19: Sections 3, 4, 5, 7, 15, 22, 33, 34, 44, 49, 46, 48, 51 & 53-55). All pits contained a single silty and or sandy silt backfill, [109], [111], [113], [117], [145], [175], [219], [223], [225], [227], [267], [271], [273], [277], [281] & [285], respectively. Only a small assemblage of finds including pottery, bone and non-diagnostic fragments of fired clay were recovered from two pits, [118] and [274]. The single sherd of pottery recovered from pit [118] had a similar coarse black fabric that those recovered in posthole [106], as discussed above, and could therefore also potentially be Iron Age. Also recovered from [118] was a heavily corroded iron object (SF 2) (Appendix 10). Although specialist examination of the iron object was undertaken, it could not be identified due to its poor state of preservation; it could potentially represent a knife blade or a pair of shears.

5.4.51 Faunal analysis of animal bone recovered from pit [118] identified a prevalence of cattle along with lesser quantities of sheep/goat and pig. A palaeoenvironmental sample taken from the backfill [117] of pit [118] (Sample 7) identified cereal remains of free-threshing wheat, barley, oat and rye along with a variety of arable weeds (Appendix 7). A small quantity of charcoal recovered was dominated by the remains of oak with lesser quantities of hazel/alder and cherry/blackthorn. Also recovered from the sample was small quantity of

material that could relate to the forging of iron including small fragments of iron smithing slag and a small piece of spheroidal hammerslag.

5.4.52 The postholes and pits represent the remains of structures probably associated with the industrial activity at the site. Although no individual buildings were identified clusters of postholes and pits within the central portion of Area 2 and the central portion of Area 1a may have indicated the locations of structures and areas of more intensive activity. Only a small quantity of pottery material was recovered from two of the features. The pottery had a coarse black fabric that was not considered to be medieval in date but could potentially be earlier, possibly Iron Age, in date. Due to the lack of any secure dating material from any of the discrete features within these areas they have tentatively been attributed to Phase 4 medieval activity but could potentially be prehistoric in date. Therefore further analysis of the essentially undated pottery coupled with AMS dating could potentially provide a secure date for these features.

5.5 Phase 5: Subsoil

5.5.1 Friable sandy silt subsoil, [101], overlay Phase 4 medieval remains and was recorded extending across the site with the exception of the southern corner where no subsoil was present. At the eastern corner of the site the subsoil was up to 0.41m thick becoming thinner towards higher elevations to the south-west and north-west and was recorded at maximum and minimum heights of 85.10m AOD and 75.68m AOD, respectively.

5.6 Phase 6: Undated Furrows.

5.6.1 An extensive and regular arrangement of NE-SW aligned plough furrows were recorded across the western portion of the site (Figure 4). These agricultural features represent potentially late medieval or post-medieval agricultural use of the site. These furrows were initially identified by geophysical survey as a series of NE-SW aligned anomalies spaced *c.* 5.80m apart and a NW-SE aligned anomaly located immediately beyond the eastern limit of excavation that probably forms a headland (AD Archaeology, 2015).

5.6.2 The furrows, [104], as exposed, measured up to 2.5m wide and were all filled by silty sand, [103], from which no datable material was recovered.

5.7 Phase 7: Modern

5.7.1 Ploughsoil formed the existing ground surface across the site and directly overlay Phase 6 undated furrows and consisted friable sandy silt, [100], up to 0.43m thick.

N

Area 1A

Area 4

Group 6

S83

S84

[350]

S86

[340]

S81

S72

[317]

S60

Group 11

S61

S73 [319]

S79

[331]

S62

S63

S64

Group 11

S74 [321]

S75 [323]

S65

S66

[327]

S76

[325]

S78

[329]

S77

S71

S92

S93

S70

Group 11

S94

S95

S96

S69

S97

S91

S90

Group 11

S68

S98

overcut

S67

Area 1

S21

[160]

Group 1

S24

[182]

[202]

S31

[354]

S88

Group 1

[304]

S59

[298]

S58

Group 17

S37

[251]

S36

[245]

Group 1

Area 2

Area 3

ditch

posthole

other

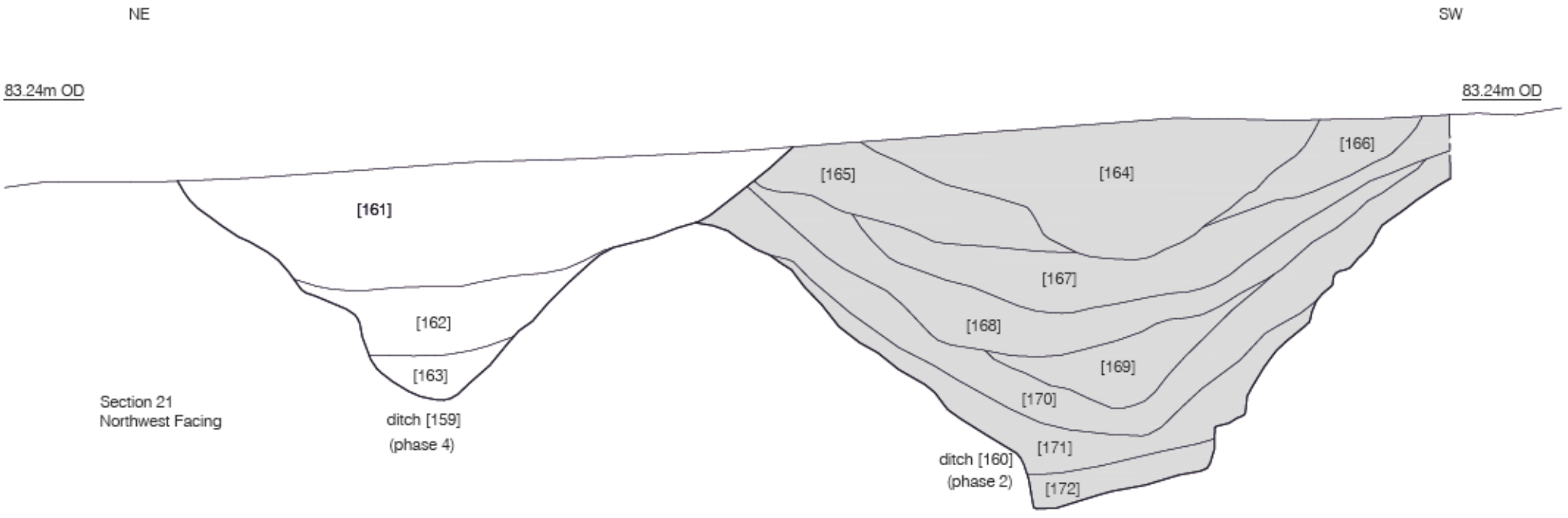
excavated

0

25m

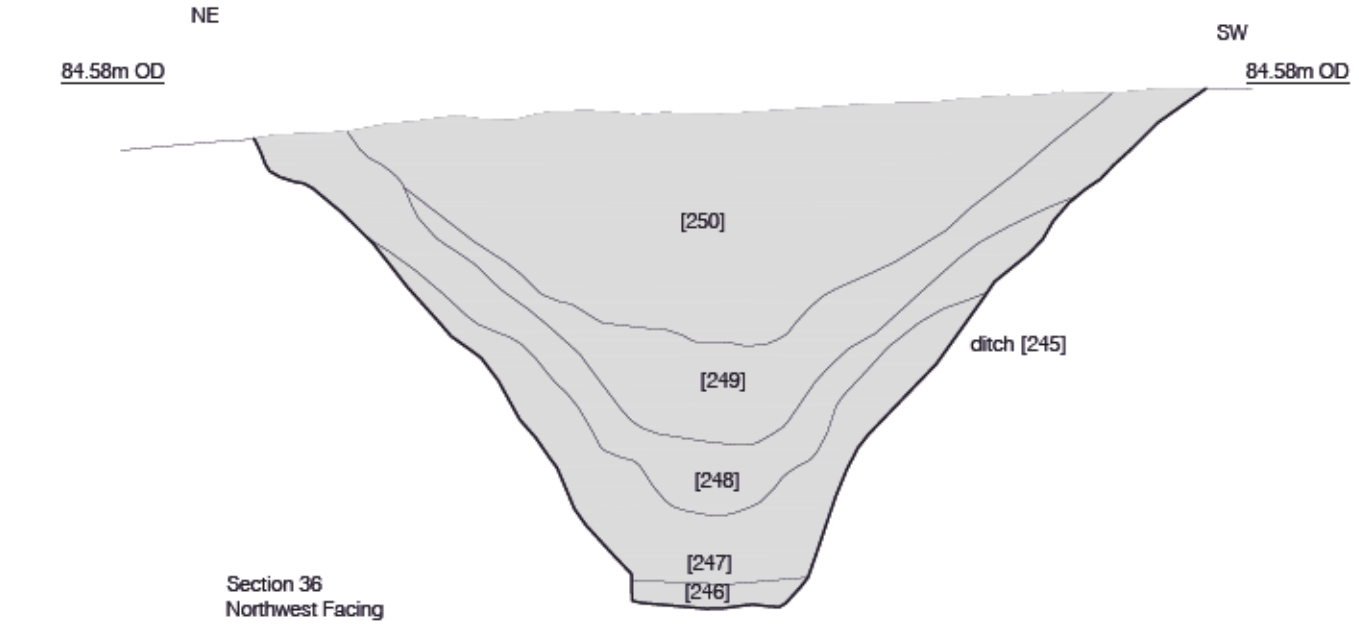
17/10/16 JS

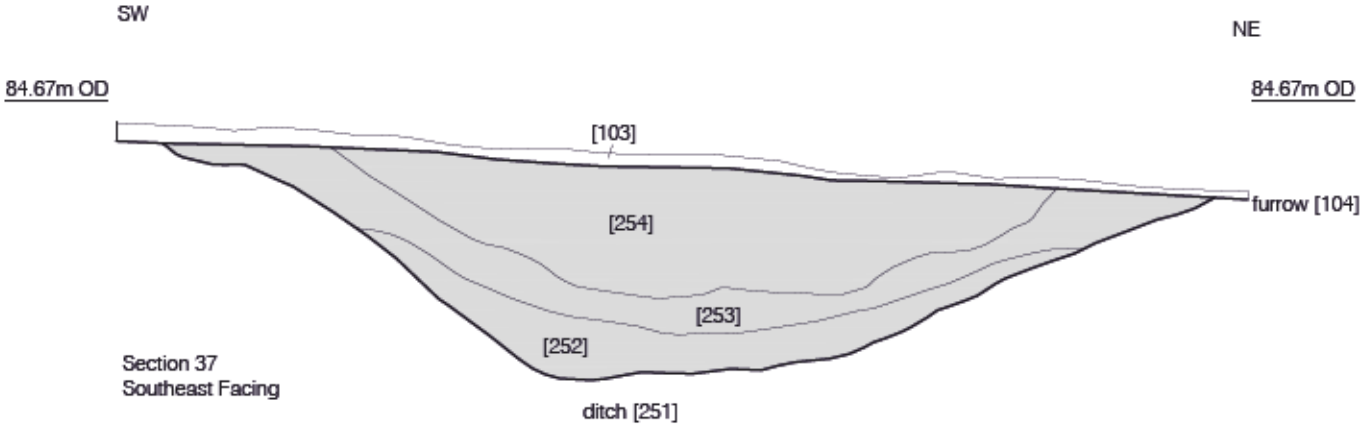
Figure 5
Phase 2
1:500 at A3

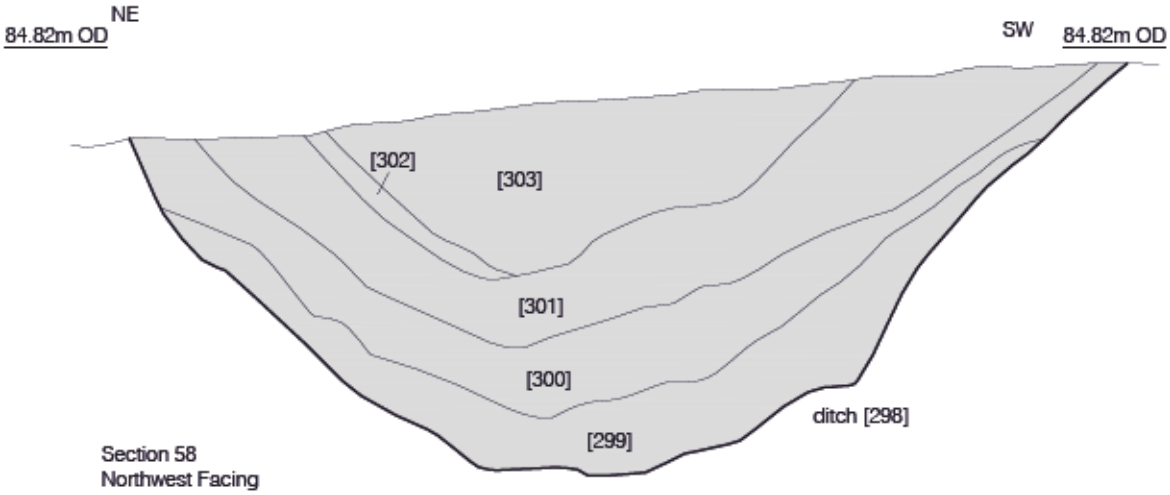


17/10/16 JS

Figure 6
Phase 2 Sections (Page 1 of 4)
1:25 at A3



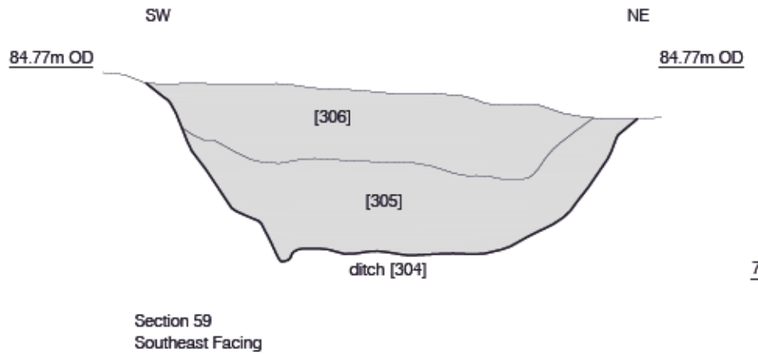




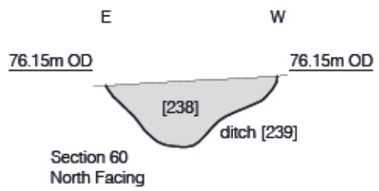
0 1m

17/10/16 JS

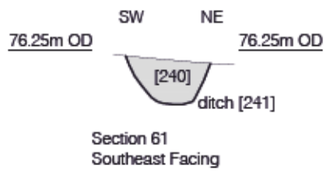
Figure 7
Phase 2 Sections (Page 2 of 4)
1:25 at A4



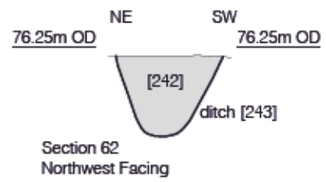
Section 59
Southeast Facing



Section 60
North Facing



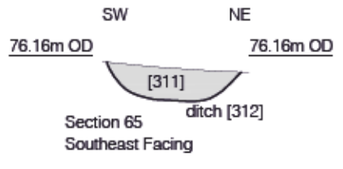
Section 61
Southeast Facing



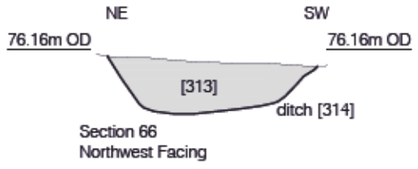
Section 62
Northwest Facing

Section 63
Southeast Facing

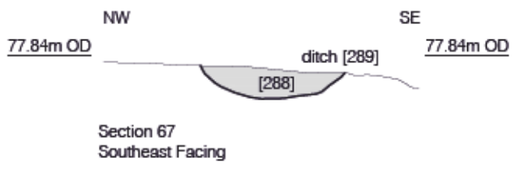
Section 64
Northwest Facing



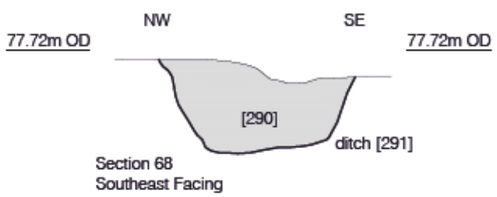
Section 65
Southeast Facing



Section 66
Northwest Facing



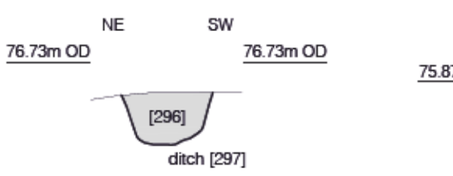
Section 67
Southeast Facing



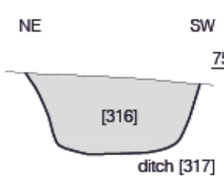
Section 68
Southeast Facing

Section 69
Southeast Facing

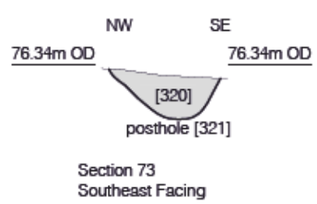
Section 70
Southeast Facing



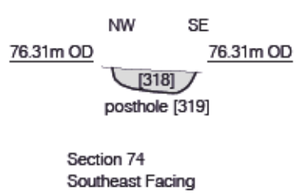
Section 71
Northwest Facing



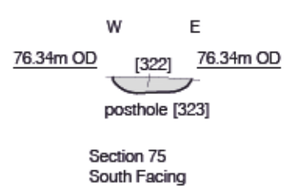
Section 72
Northwest Facing



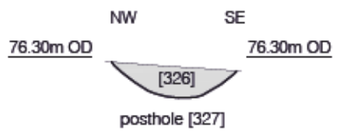
Section 73
Southeast Facing



Section 74
Southeast Facing



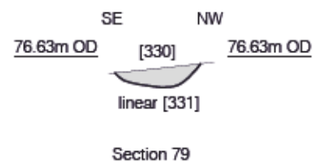
Section 75
South Facing



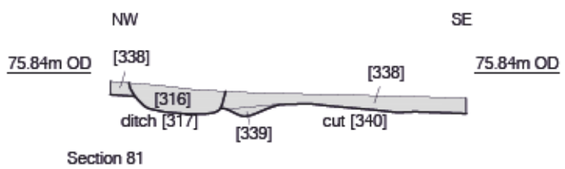
Section 76
Southeast Facing

Section 77
Southeast Facing

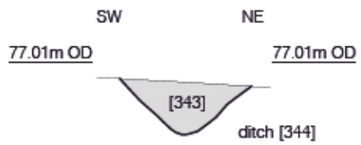
Section 78
Southeast Facing



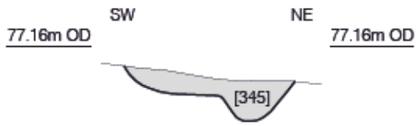
Section 79
Northeast Facing



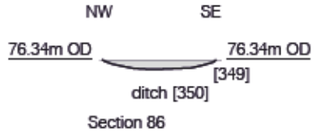
Section 81
Southeast Facing



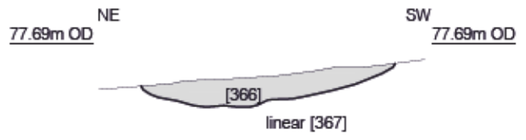
Section 83
Southeast Facing



Section 84
Southeast Facing



Section 86
Southwest Facing

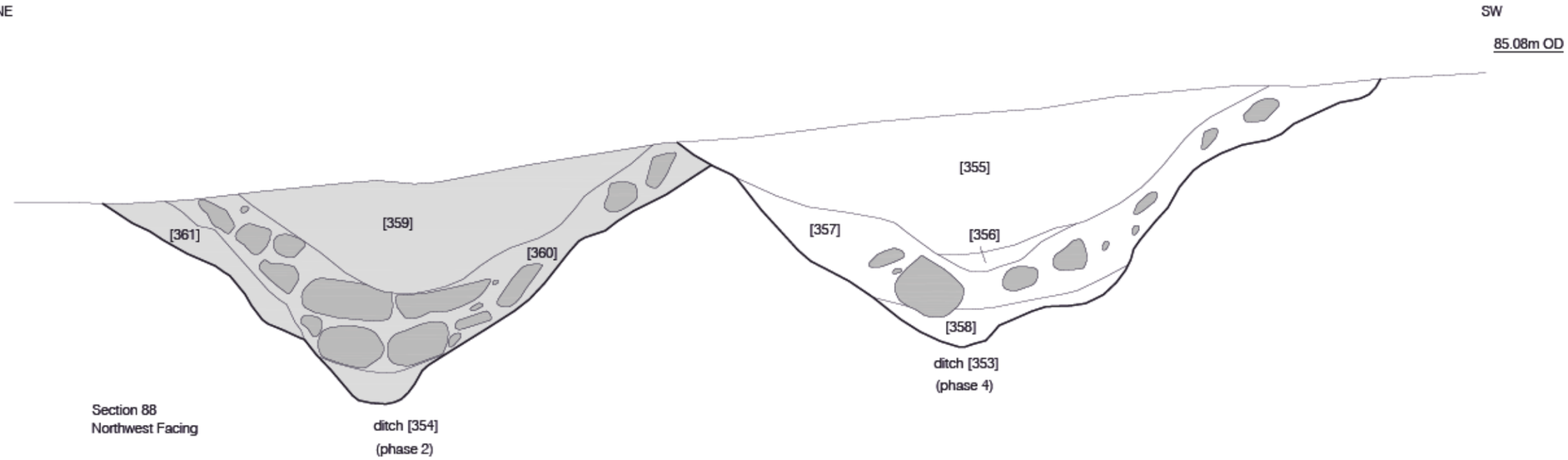


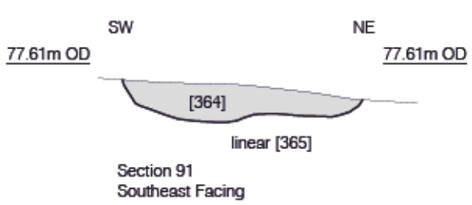
Section 90
Northwest Facing

0 1m

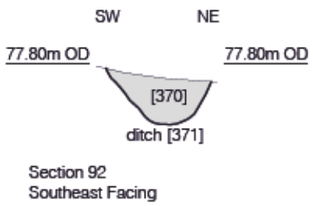
17/10/16 JS

Figure 8
Phase 2 Sections (Page 3 of 4)
1:25 at A3

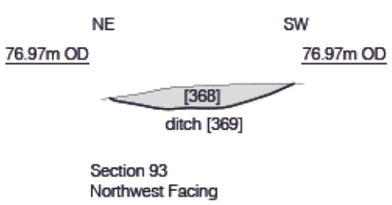




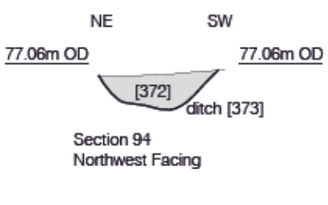
Section 91
Southeast Facing



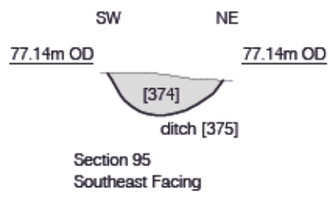
Section 92
Southeast Facing



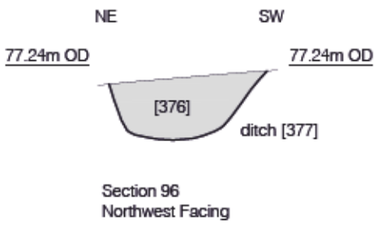
Section 93
Northwest Facing



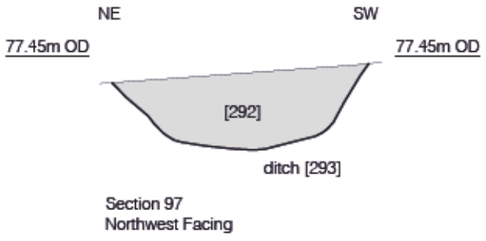
Section 94
Northwest Facing



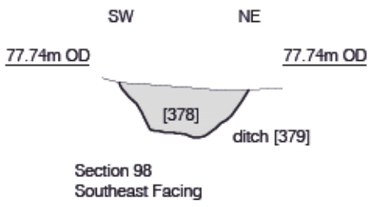
Section 95
Southeast Facing



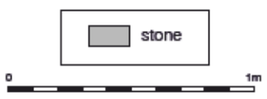
Section 96
Northwest Facing



Section 97
Northwest Facing



Section 98
Southeast Facing



17/10/16 JS

Figure 9
Phase 2 Sections (Page 4 of 4)
1:25 at A3

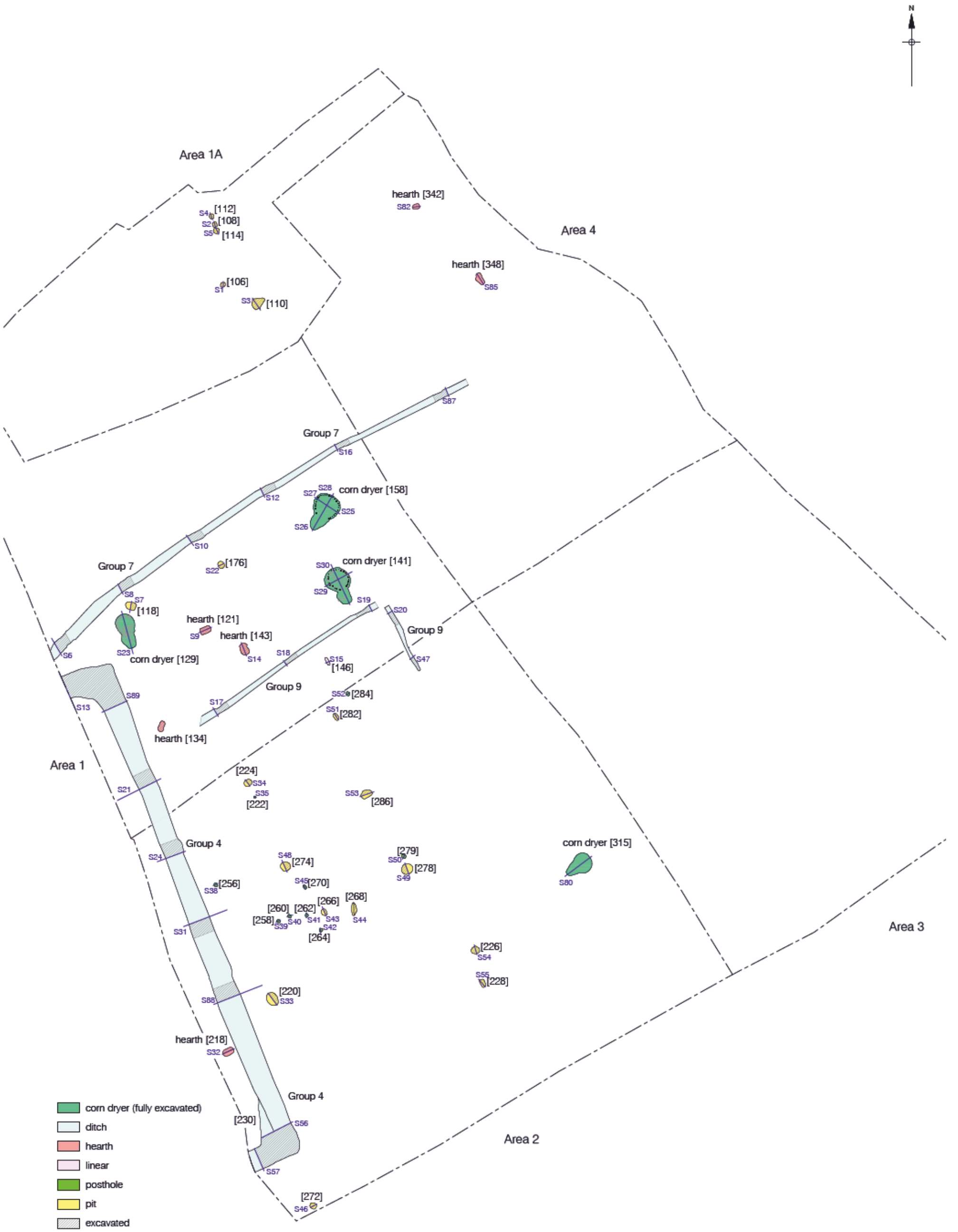
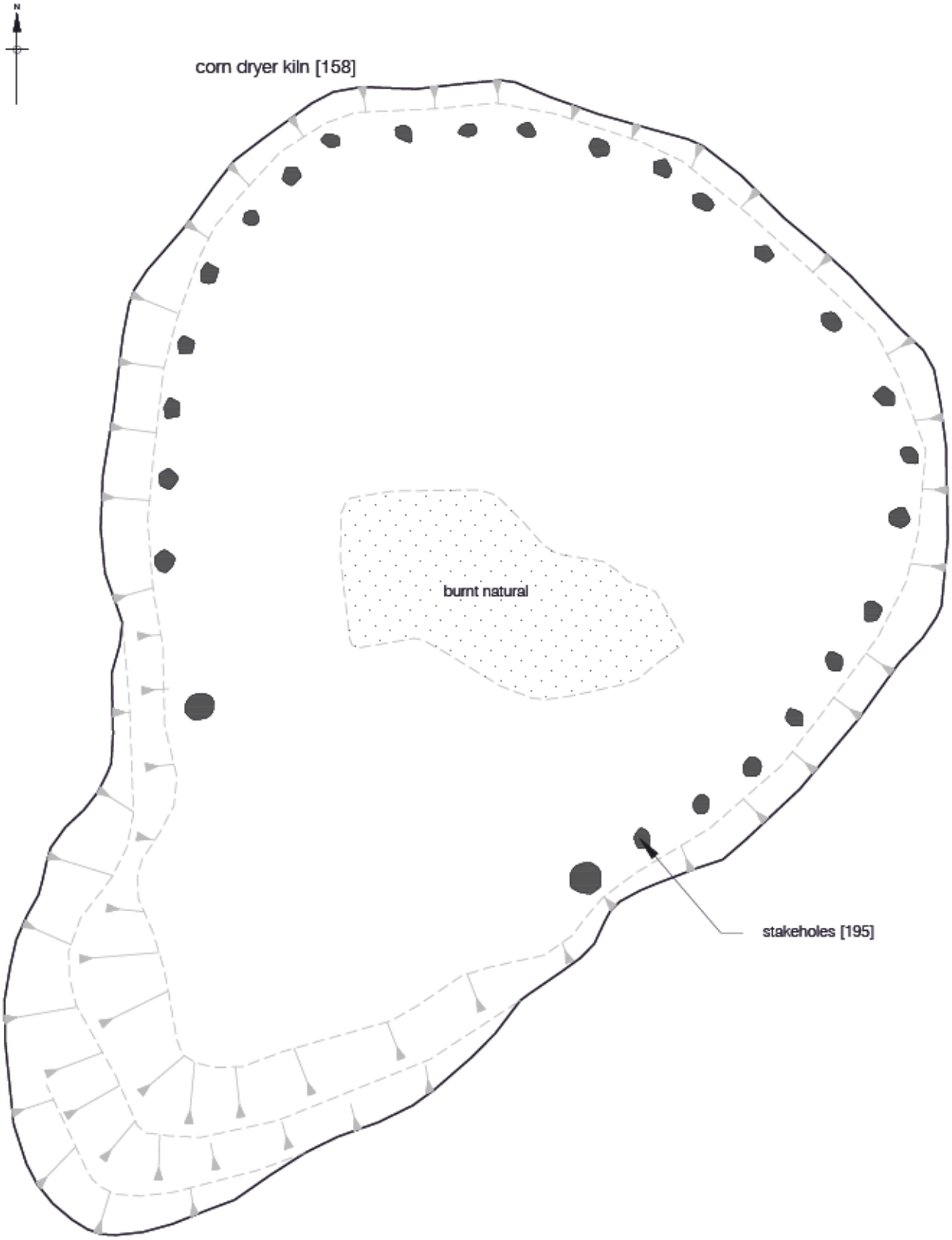


Figure 10
Phase 4
1:500 at A3

0 1m

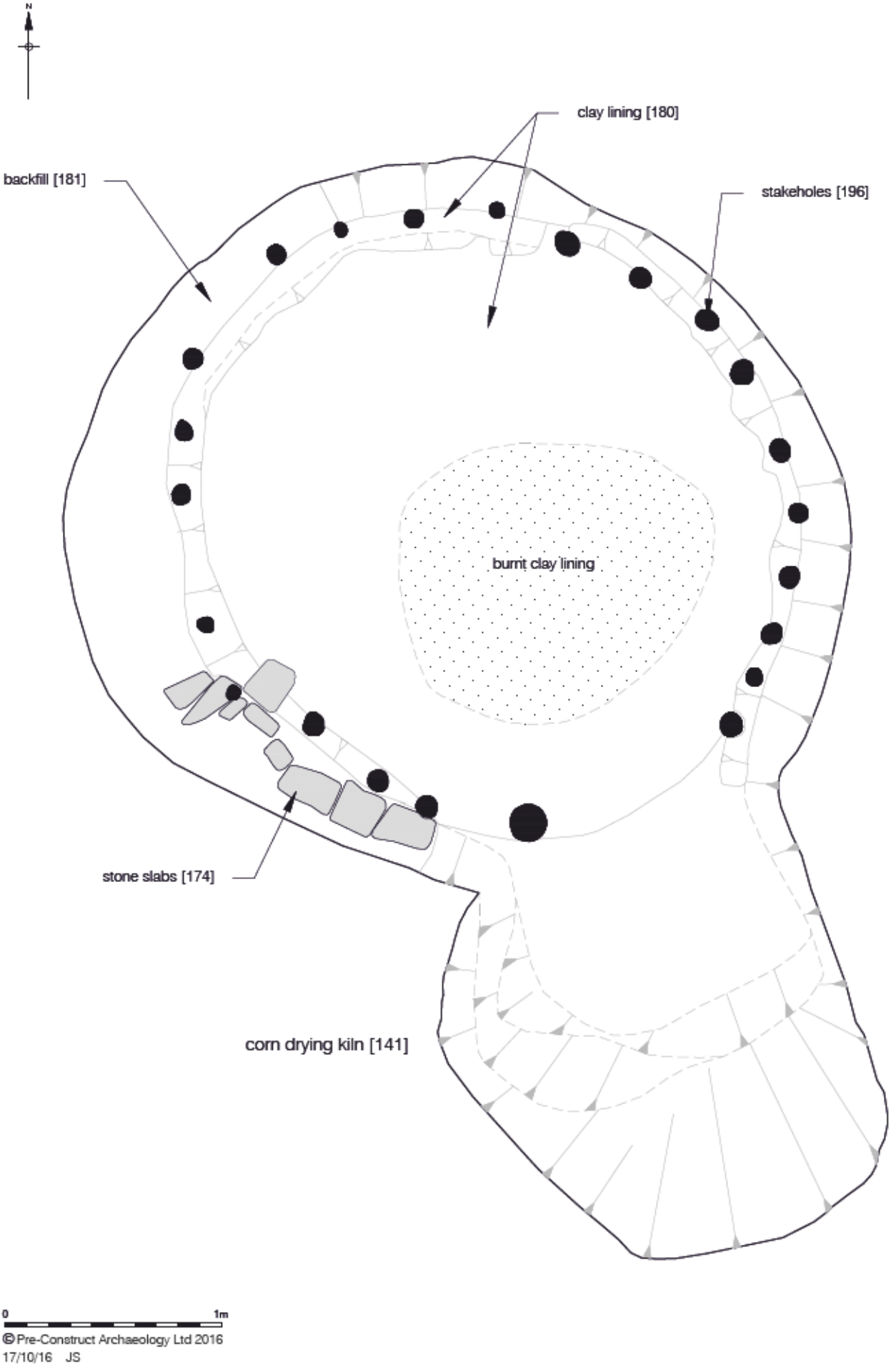
17/10/16 JS

Figure 11
Detail of corn drying kiln [129]
1:25 at A4



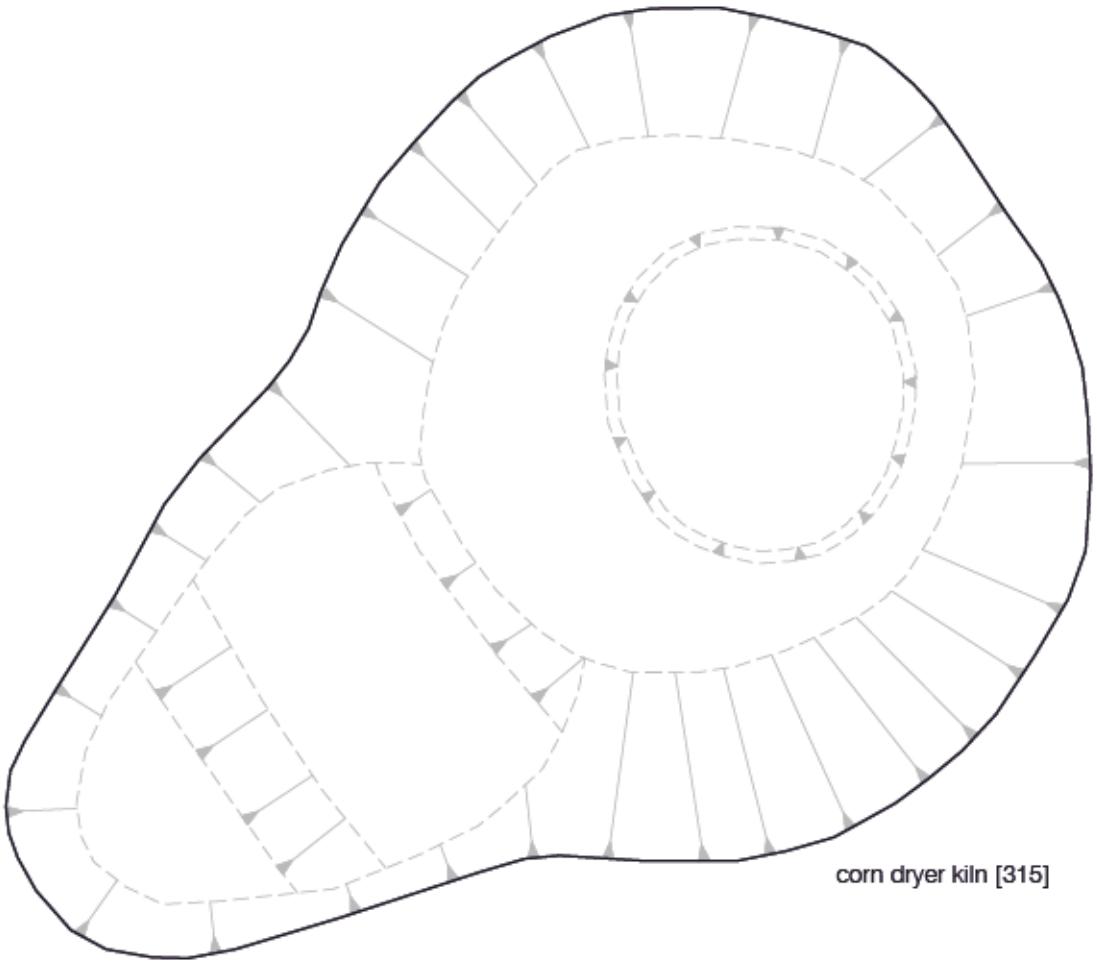
17/10/16 JS

Figure 12
Detail of corn dryer kiln [158]
1:25 at A4



17/10/16 JS

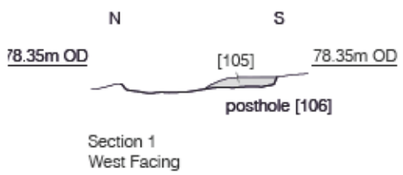
Figure 13
Detail of corn drying kiln [141]
1:25 at A4



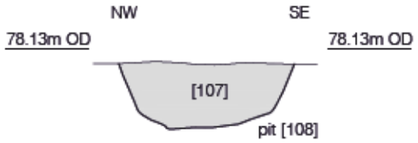
0 1m

17/10/16 JS

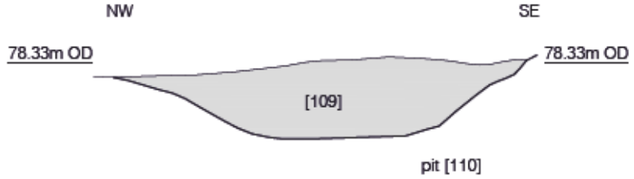
Figure 14
Detail of corn drying kiln [315]
1:25 at A4



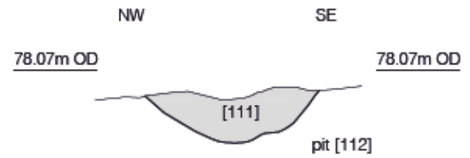
Section 1
West Facing



Section 2
Southwest Facing

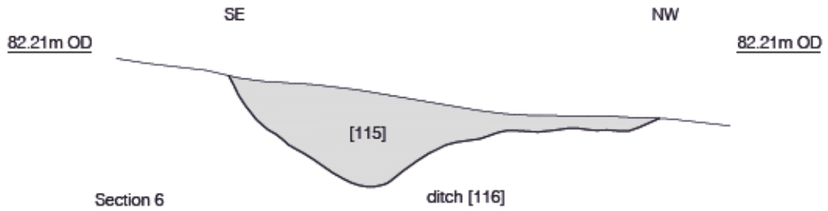


Section 3
Southwest Facing

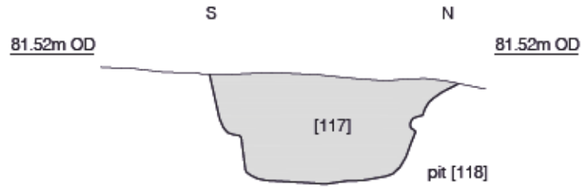


Section 4
Southwest Facing

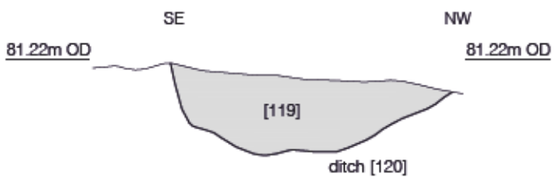
Section 5
Southwest Facing



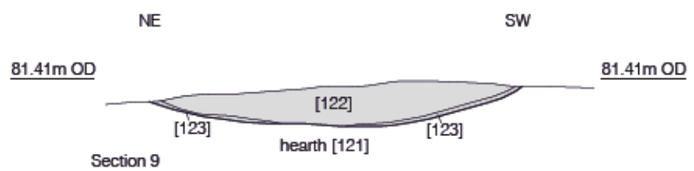
Section 6
Northeast Facing



Section 7
East Facing



Section 8
Northeast Facing

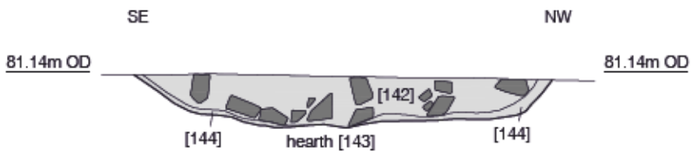


Section 9
Northwest Facing

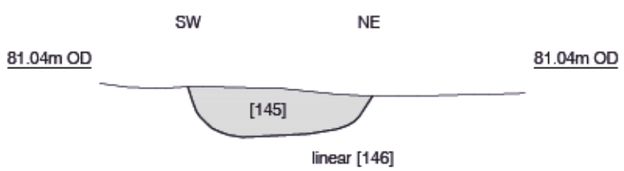
Section 10
Northeast Facing

Section 12
Northeast Facing

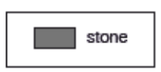
Section 13
Northeast Facing



Section 14
Northeast Facing

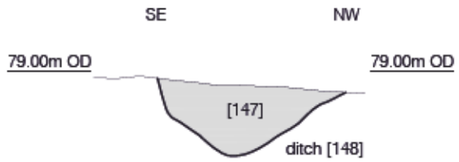


Section 15
Southeast Facing

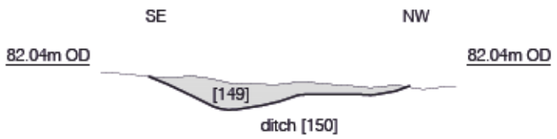


17/10/16 JS

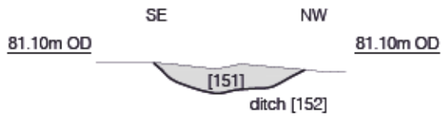
Figure 15
Phase 4 Sections (Page 1 of 6)
1:25 at A3



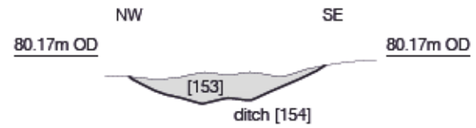
Section 16
Northeast Facing



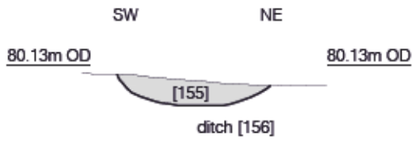
Section 17
Northeast Facing



Section 18
Northeast Facing

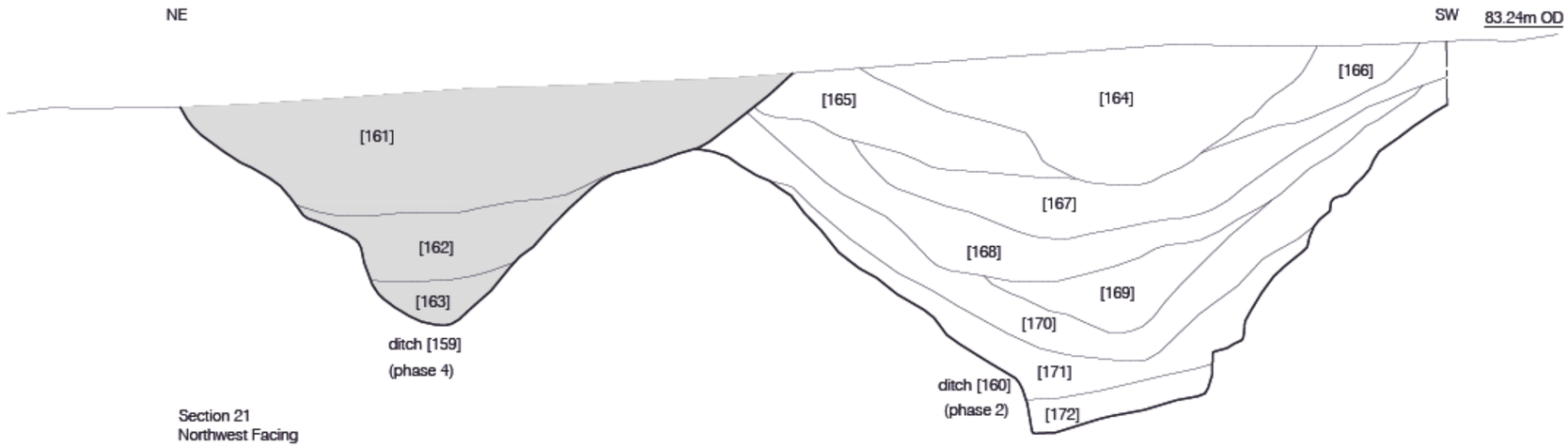


Section 19
Southwest Facing

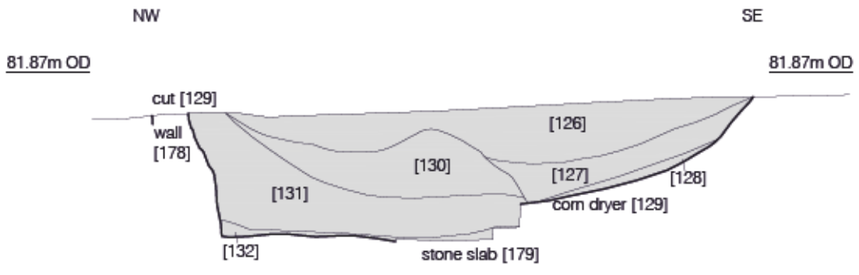


Section 20
Southeast Facing

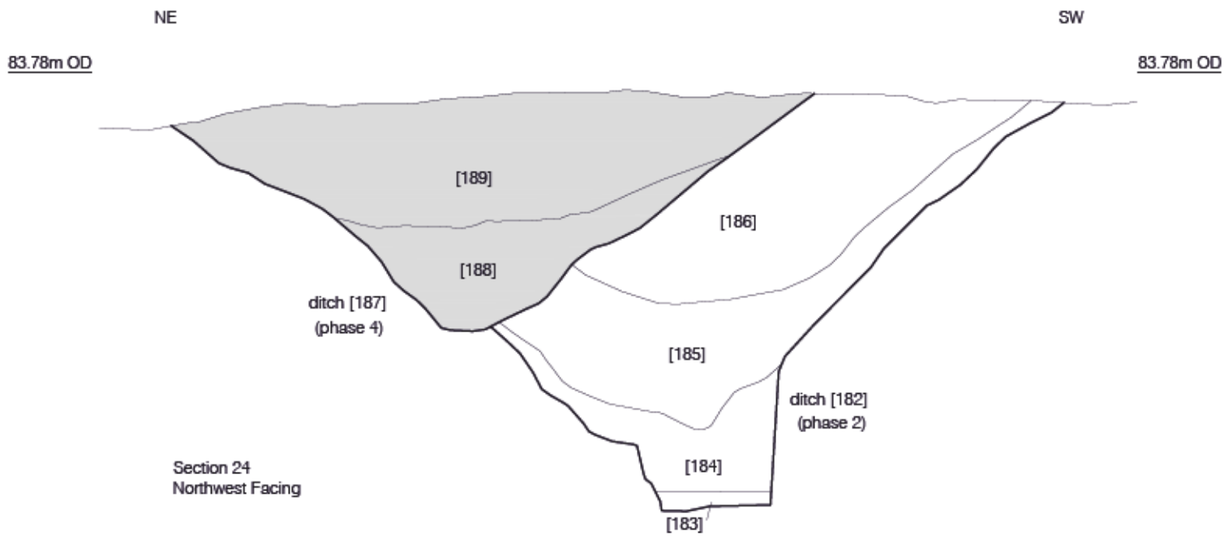
Section 22
Northwest Facing



Section 21
Northwest Facing



Section 23
Southwest Facing



Section 24
Northwest Facing

0 1m

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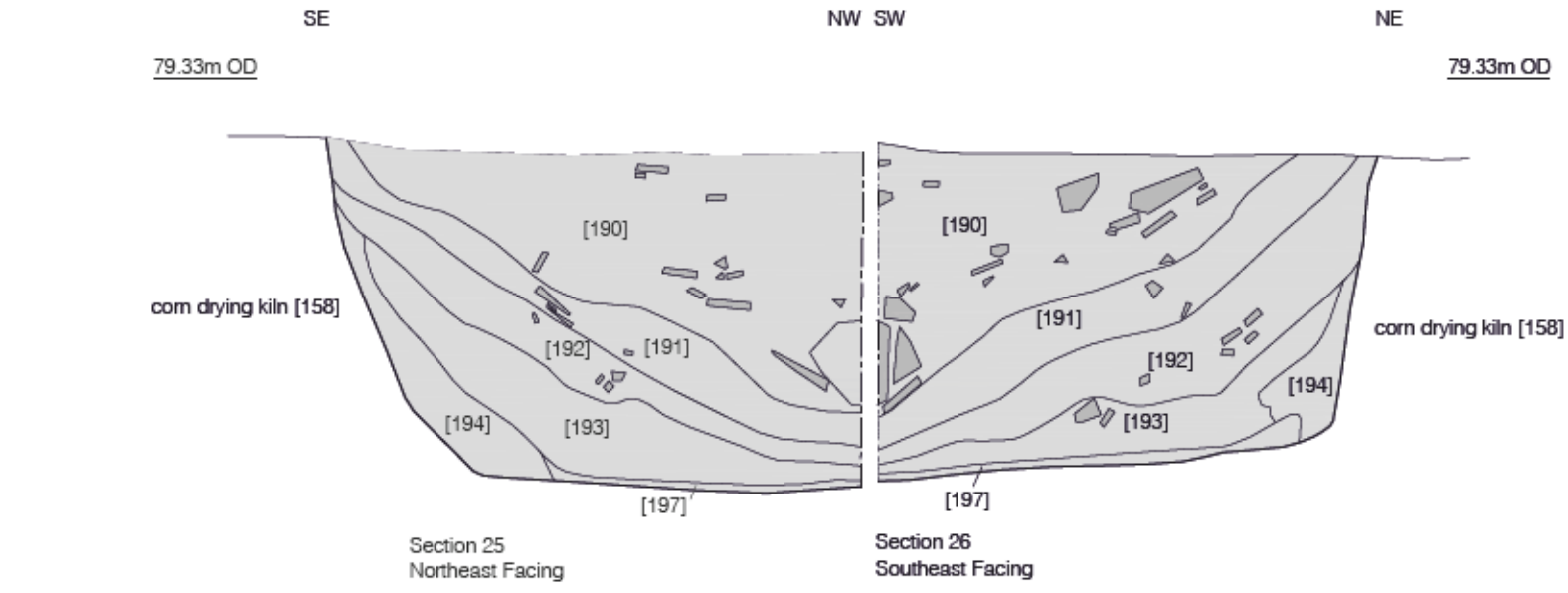
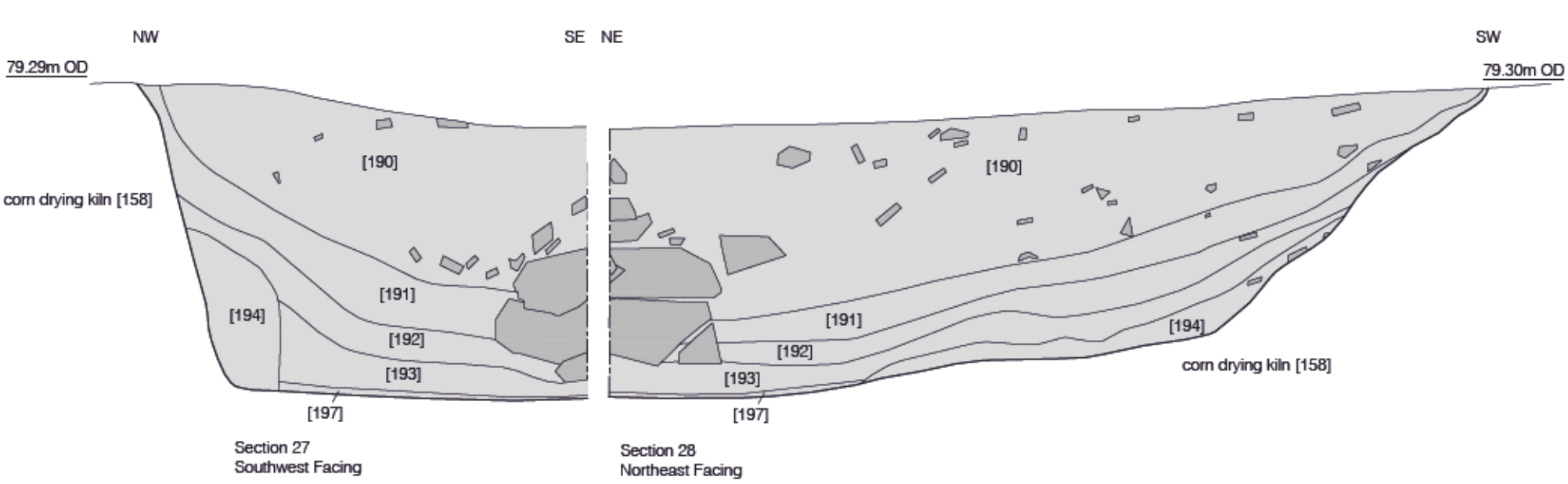
Figure 16
Phase 4 Sections (Page 2 of 6)
1:25 at A3





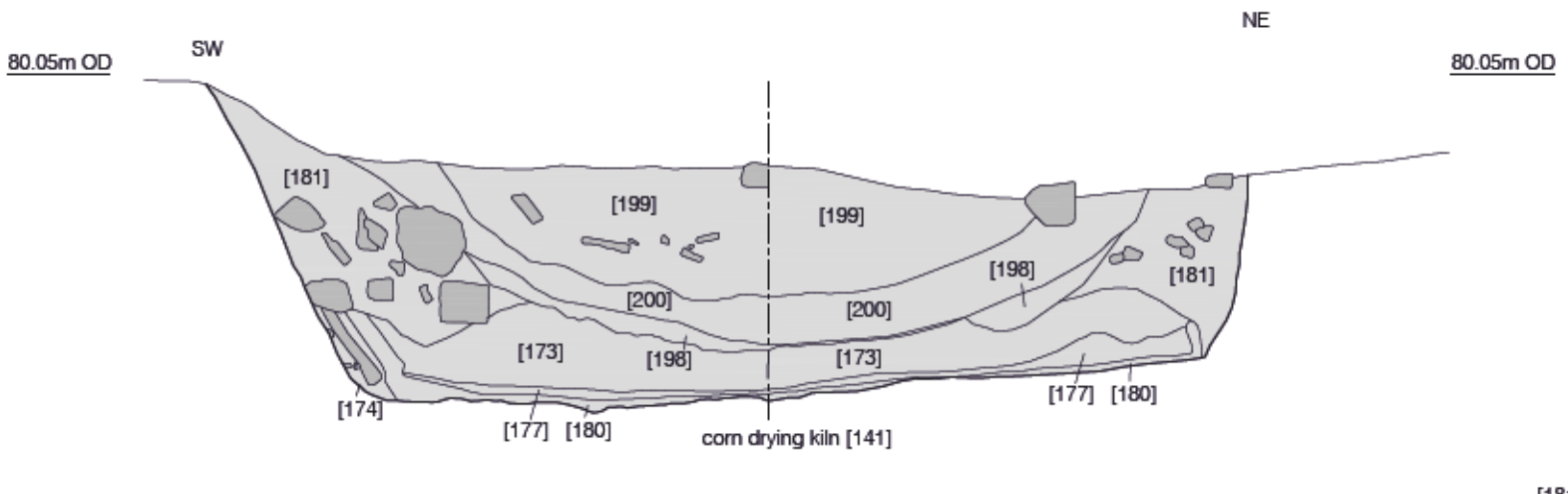


Figure 17
Phase 4 Sections (Page 3 of 6)
1:25 at A3

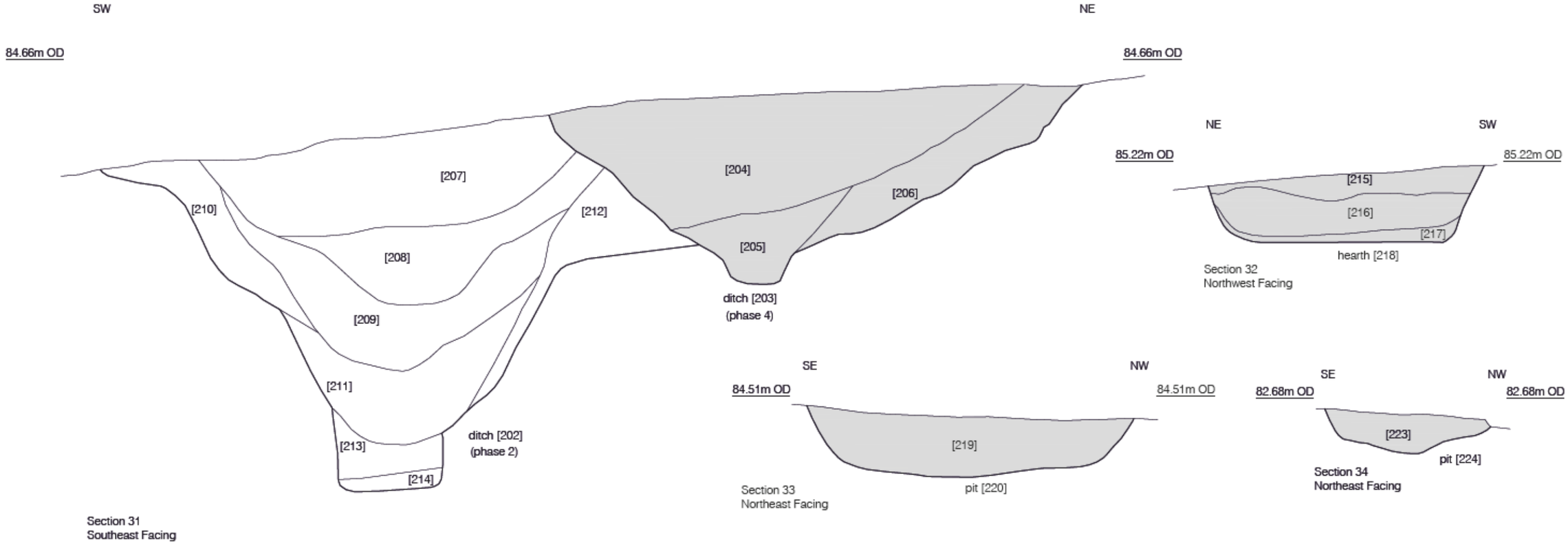
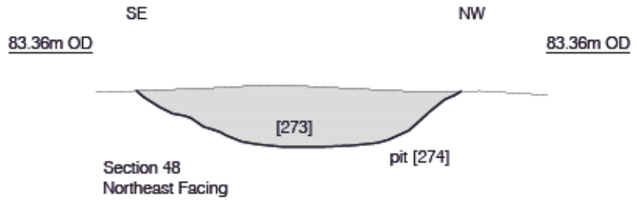
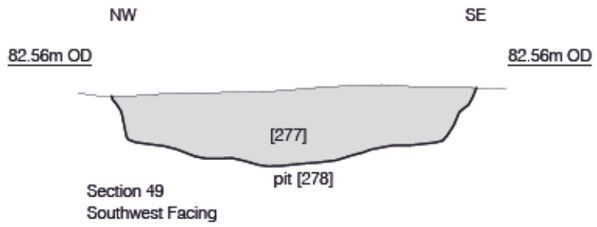
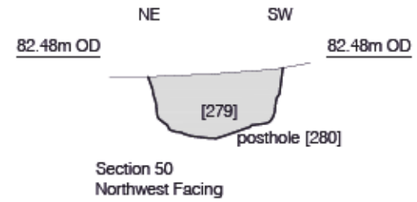
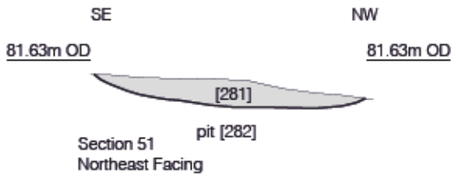


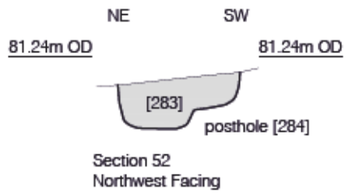
Figure 18
Phase 4 Sections (Page 4 of 6)
1:25 at A3

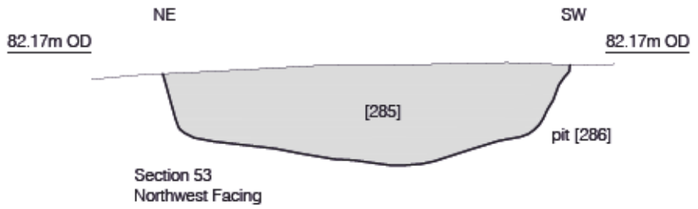


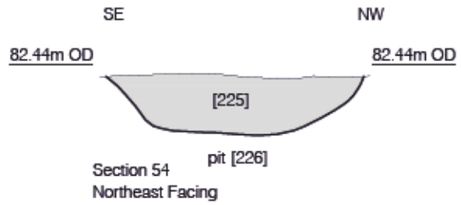


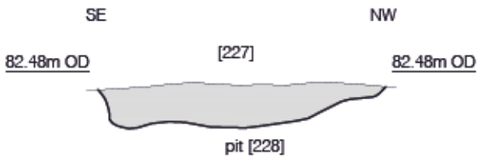


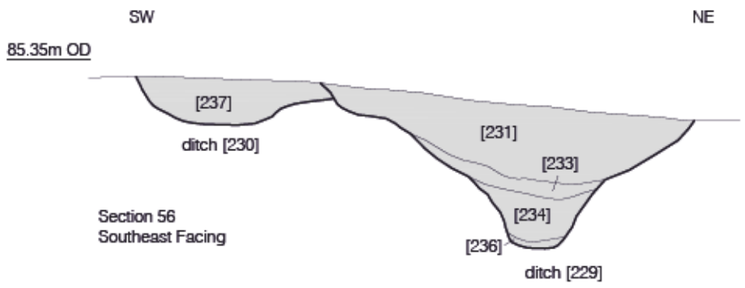


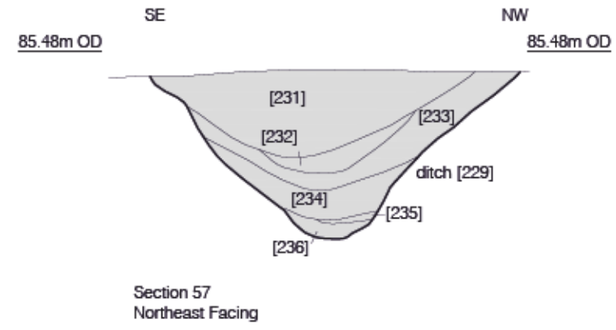


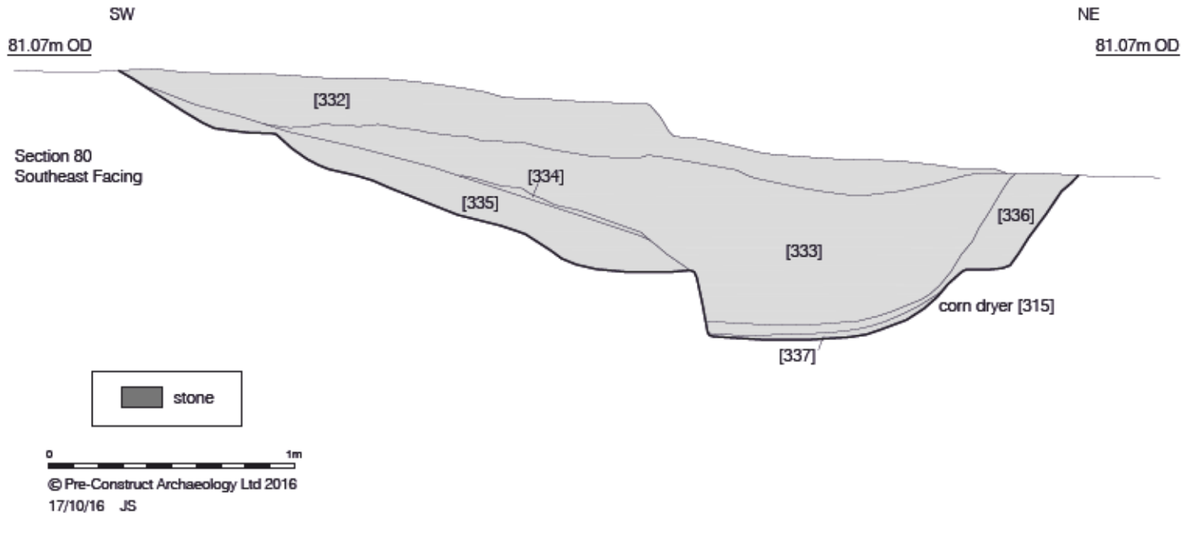












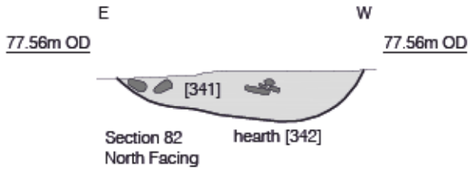


Figure 19
Phase 4 Sections (Page 5 of 6)
1:25 at A3

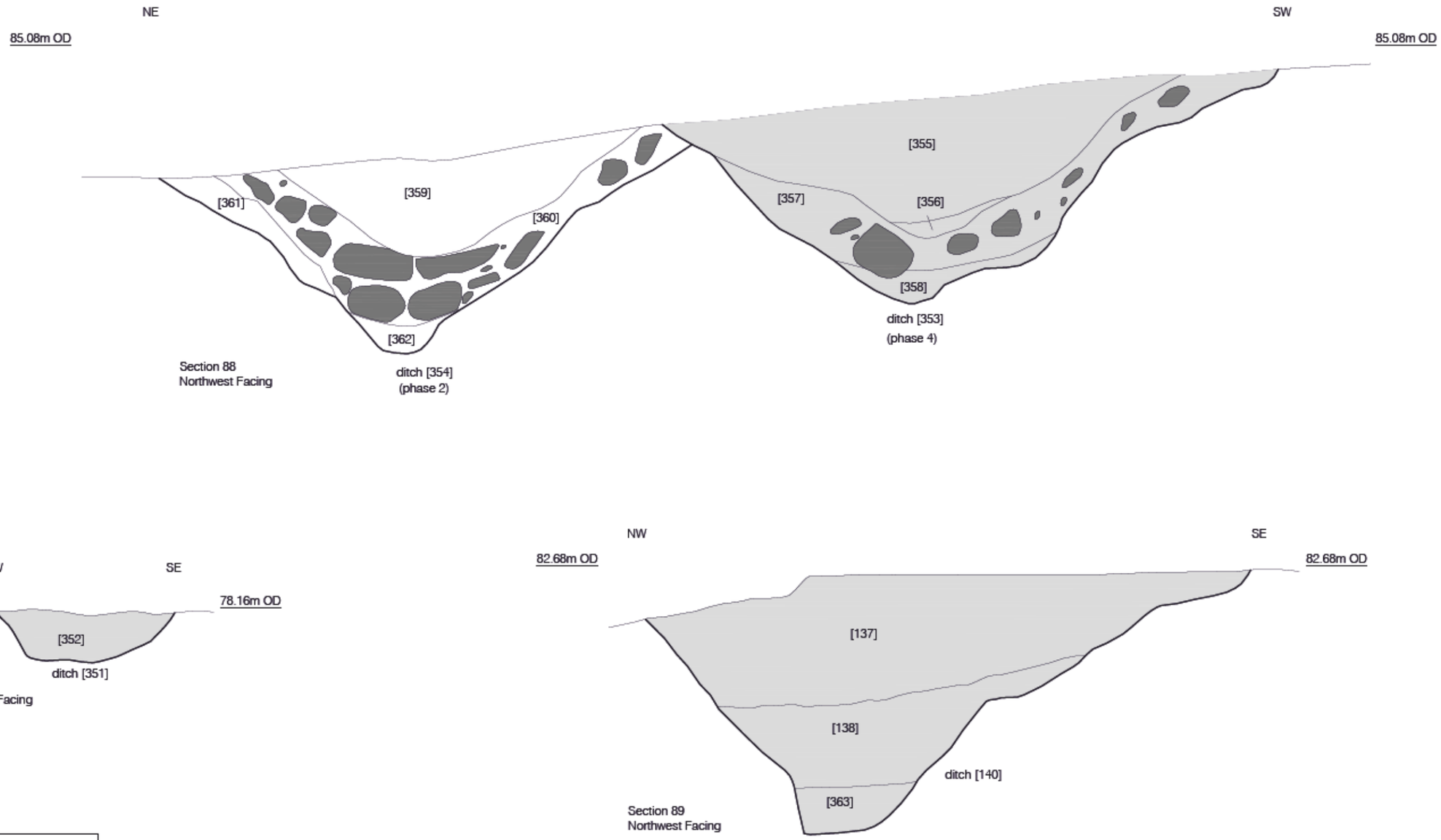


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Figure 20
Phase 4 Sections (Page 6 of 6)
1:25 at A3

6. STRATIGRAPHIC DATA

6.1 Paper Records

6.1.1 The paper element of the Site Archive is as follows:

Item	No.	Sheets
Context register	1	6
Context/Group Sheets	283	283
Section register	1	3
Section drawings	98	69
Plans	87	111

Table 6.1: Contents of the paper archive

6.2 Photographic Records

6.2.1 The photographic element of the Site Archive is as follows:

Item	No.	Sheets
Monochrome print registers	6	11
Monochrome prints	203	29
Monochrome Negatives	203	9
Digital photograph registers	1	18
Digital photographs	478	N/A

Table 6.2: Contents of the photographic archive

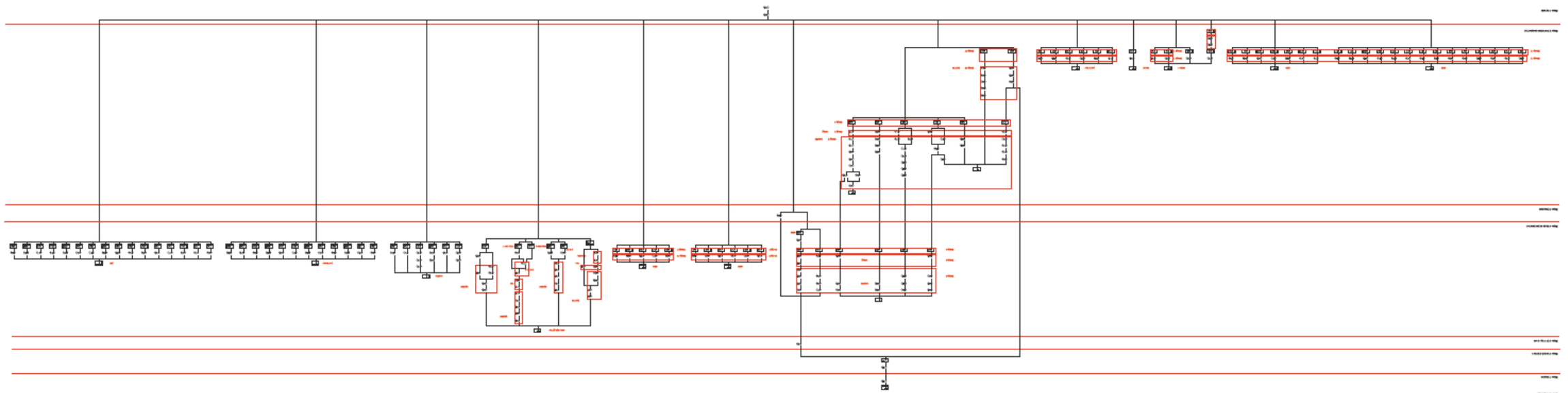
6.3 Site Archive

6.3.1 The complete Site Archive, including the paper and photographic records, is currently housed at the PCA Northern Regional Office.

6.3.2 The Site Archive will eventually be deposited at Tyne and Wear Archives and Museums, Arbeia Roman Fort, South Shields, Tyne and Wear, under the site code ERS 16, for permanent storage and the detailed requirements of the repository will be met prior to deposition.

APPENDIX 1

STRATIGRAPHIC MATRIX



APPENDIX 2

CONTEXT INDEX

ERS 16: CONTEXT INDEX

Context	*Group*	*Area*	*Phase*	*Type 1*	*Type 2*	*Interpretation*
100		1, 2, 3, 4	7	Deposit	Layer	Topsoil
101		1, 2, 3, 4	5	Deposit	Layer	Developed soil
102		1, 2, 3, 4	1	Deposit	Layer	Natural
103		1, 2, 3, 4	6	Deposit	Fill	Fill of furrows [104]
104		1, 2, 3, 4	6	Cut	Linear	Furrows filled by (103)
105		1	4	Deposit	Fill	Fill of posthole [106]
106		1	4	Cut	Discrete	Posthole filled by (105)
107		1	4	Deposit	Fill	Fill of posthole [108]
108		1	4	Cut	Discrete	Posthole filled by (107)
109		1	4	Deposit	Fill	Fill of pit [110]
110		1	4	Cut	Discrete	Pit filled by (109)
111		1	4	Deposit	Fill	Fill of pit [112]
112		1	4	Cut	Discrete	Pit filled by (111)
113		1	4	Deposit	Fill	Fill of pit [114]
114		1	4	Cut	Discrete	Pit filled by (113)
115	8	1	4	Deposit	Fill	Fill of ditch [116]
116	7	1	4	Cut	Linear	Ditch filled by (115)
117		1	4	Deposit	Fill	Fill of pit [118]
118		1	4	Cut	Linear	Pit filled by (117)
119	8	1	4	Deposit	Fill	Fill of ditch [120]
120	7	1	4	Cut	Linear	Ditch filled by (119)
121		1	4	Cut	Discrete	Hearth filled by (122), (123)
122		1	4	Deposit	Fill	Fill of hearth [121]
123		1	4	Deposit	Fill	Fill of hearth [121]
124	8	1	4	Deposit	Fill	Fill of ditch [125]
125	7	1	4	Cut	Linear	Ditch filled by (124)
126		1	4	Deposit	Fill	Backfill of corn-drying kiln [129]
127		1	4	Deposit	Fill	Backfill of corn-drying kiln [129]
128		1	4	Deposit	Fill	Fill of corn-drying kiln [129]
129		1	4	Cut	Discrete	Construction cut for corn-drying kiln filled by (126), (127), (128), (130), (131), (132), (178), (179)
130		1	4	Deposit	Fill	Backfill of corn-drying kiln [129]
131		1	4	Deposit	Fill	Backfill of corn-drying kiln [129]
132		1	4	Deposit	Fill	Fill of corn-drying kiln [129]
133		1	4	Deposit	Fill	Fill of hearth [134]
134		1	4	Cut	Discrete	Hearth filled by (133)
135		1	4	Deposit	Fill	Fill of ditch [136]
136	7	1	4	Cut	Linear	Ditch filled by (135)
137	6	1	4	Deposit	Fill	Backfill of enclosure ditch [140]
138	6	1	4	Deposit	Fill	Backfill of enclosure ditch [140]
139	6	1	4	Deposit	Fill	Backfill of enclosure ditch [140],
140	4	1	4	Cut	Linear	Enclosure ditch filled by (137), (138), (139), (363), group [4]
141		1	4	Cut	Discrete	corn-drying kiln filled by (173), (174), (177), (180), (181), (198), (199), (200), (201)
142		1	4	Deposit	Fill	Fill of hearth [143]
143		1	4	Cut	Discrete	Hearth filled by (142), (143)
144		1	4	Deposit	Fill	Fill of hearth [143]
145		1	4	Deposit	Fill	Fill of linear feature [146]
146		1	4	Cut	Linear	Linear feature filled by (145)
147	8	1	4	Deposit	Fill	Fill of ditch [148]
148	8	1	4	Cut	Linear	Ditch filled by (147)
149	10	1	4	Deposit	Fill	Fill of ditch [150]
150	9	1	4	Cut	Linear	Ditch filled by (149)
151	10	1	4	Deposit	Fill	Fill of ditch [152]
152	9	1	4	Cut	Linear	Ditch filled by (151)
153	10	1	4	Deposit	Fill	Fill of ditch [154]
154	9	1	4	Cut	Linear	Ditch filled by (153)
155	10	1	4	Deposit	Fill	Fill of ditch [156]

ERS 16: CONTEXT INDEX

Context	*Group*	*Area*	*Phase*	*Type 1*	*Type 2*	*Interpretation*
156	9	1	4	Cut	Linear	Ditch filled by (155)
157						number not used
158		1	4	Cut	Discrete	corn-drying kiln filled by (190), (191), (192), (193), (194), (197)
159		1	4	Cut	Linear	Enclosure ditch filled by (161), (162), (163)
160	1	1	2	Cut	Linear	Enclosure ditch filled by (164), (165), (166), (167), (168), (169), (170), (171), (172)
161	6	1	4	Deposit	Fill	Backfill of enclosure ditch [159]
162	6	1	4	Deposit	Fill	Backfill of enclosure ditch [159]
163	5	1	4	Deposit	Fill	Silting of enclosure ditch [159]
164	3	1	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [160]
165	3	1	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [160]
166	3	1	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [160]
167	3	1	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [160]
168	3	1	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [160]
169	3	1	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [160]
170	3	1	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [160]
171	3	1	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [160]
172	2	1	2	Deposit	Fill	Natural silting of enclosure ditch [160]
173		1	4	Deposit	Fill	Backfill of corn-drying kiln [141]
174		1	4	Masonry	Structure	Stone slabs lining corn-drying kiln [141]
175		1	4	Deposit	Fill	Fill of pit [176]
176		1	4	Cut	Discrete	Pit filled by (175)
177		1	4	Deposit	Fill	Charred wheat deposit in corn-drying kiln [141]
178		1	4	Masonry	Structure	Stone wall lining for corn-drying kiln [129]
179		1	4	Masonry	Surface	Stone slab surface for corn-drying kiln [129]
180		1	4	Deposit	structure	Clay lining for corn-drying kiln [141]
181		1	4	Deposit	Fill	Backfill of corn-drying kiln [141]
182	1	2	2	Cut	Linear	Enclosure ditch filled by (183), (184), (185), (186)
183	2	2	2	Deposit	Fill	Silting of enclosure ditch [182]
184	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [182]
185	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [182]
186	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [182]
187	4	2	4	Cut	Linear	Enclosure ditch filled by (188), (189)
188	6	2	4	Deposit	Fill	Backfill of enclosure ditch [187]
189	6	2	4	Deposit	Fill	Backfill of enclosure ditch [187]
190		1	4	Deposit	Fill	Backfill of corn-drying kiln [158]
191		1	4	Deposit	Fill	Backfill of corn-drying kiln [158]
192		1	4	Deposit	Fill	Backfill of corn-drying kiln [158]
193		1	4	Deposit	Fill	Backfill of corn-drying kiln [158]
194		1	4	Deposit	Fill	Backfill of corn-drying kiln [158]
195		1	4	Cut	Discrete	Stake holes within corn-drying kiln [158], filled by (197)

ERS 16: CONTEXT INDEX

Context	*Group*	*Area*	*Phase*	*Type 1*	*Type 2*	*Interpretation*
196		1	4	Cut	Discrete	Stake holes within corn-drying kiln [141], filled by (244)
197		1	4	Deposit	Structure	Clay lining for corn-drying kiln [158]
198		1	4	Deposit	Fill	Backfill of corn-drying kiln [141]
199		1	4	Deposit	Fill	Backfill of corn-drying kiln [141]
200		1	4	Deposit	Fill	Backfill of corn-drying kiln [141]
201		1	4	Deposit	Fill	Fill of corn-drying kiln [141]
202	1	2	2	Cut	Linear	Enclosure ditch filled by (207), (208), (209), (210), (211), (212), (213), (214)
203	2	2	4	Cut	Linear	Enclosure ditch filled by (204), (205), (206)
204	6	2	4	Deposit	Fill	Backfill of enclosure ditch [203]
205	6	2	4	Deposit	Fill	Backfill of enclosure ditch [203]
206	6	2	4	Deposit	Fill	Backfill of enclosure ditch [203]
207	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [202]
208	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [202]
209	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [202]
210	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [202]
211	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [202]
212	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [202]
213	3	2	2	Deposit	Fill	Natural silting/slumping of enclosure ditch [202]
214	2	2	2	Deposit	Fill	Silting of enclosure ditch [202]
215		2	4	Deposit	Fill	Fill of hearth [218]
216		2	4	Deposit	Fill	Fill of hearth [218]
217		2	4	Deposit	Fill	Fill of hearth [218]
218		2	4	Cut	Discrete	Hearth filled by (215), (216), (217)
219		2	4	Deposit	Fill	Fill of pit [220]
220		2	4	Cut	Discrete	Pit filled by (219)
221		2	4	Deposit	Fill	Fill of posthole [222]
222		2	4	Cut	Discrete	Posthole filled by (221)
223		2	4	Deposit	Fill	Fill of pit [224]
224		2	4	Cut	Discrete	Pit filled by (223)
225		2	4	Deposit	Fill	Fill of pit [226]
226		2	4	Cut	Discrete	Pit filled by (225)
227		2	4	Deposit	Fill	Fill of pit [228]
228		2	4	Cut	Discrete	Pit filled by (227)
229	4	2	4	Cut	Linear	Enclosure ditch filled by (231), (232), (233), (234), (235), (236)
230		2	4	Cut	Linear	Ditch filled by (237)
231	6	2	4	Deposit	Fill	Backfill of enclosure ditch [229]
232	6	2	4	Deposit	Fill	Backfill of enclosure ditch [229]
233	6	2	4	Deposit	Fill	Backfill of enclosure ditch [229]
234	6	2	4	Deposit	Fill	Backfill of enclosure ditch [229]
235	5	2	4	Deposit	Fill	Silting of enclosure ditch [229]
236	5	2	4	Deposit	Fill	Silting of enclosure ditch [229]
237		2	4	Deposit	Fill	Backfill of ditch [230]
238	12	4	2	Deposit	Fill	Silting of segmented ditch [239]
239	11	4	2	Cut	Linear	Segmented ditch filled by (238)
240	12	4	2	Deposit	Fill	Silting of segmented ditch [241]
241	11	4	2	Cut	Linear	Segmented ditch filled by (240)
242	12	4	2	Deposit	Fill	Silting of segmented ditch [243]
243	11	4	2	Cut	Linear	Segmented ditch filled by (242)
244		1	4	Deposit	Fill	Fill of stake holes [196] within corn-drying kiln [141]

Plate 1. North-west facing section, Phase 2 enclosure ditch terminus [245] (scale 2m)

Plate 2. Overview, showing Phase 2 enclosure ditch terminus [298] and [304], ENE direction of view (scale 2m)

Plate 3. North-west facing section, Phase 2 enclosure ditch [160] and Phase 4 enclosure ditch [159], (scale 2m)

Plate 4. North-west facing section, Phase 2 enclosure ditch [182] and Phase 4 enclosure ditch [187], (scale 2m)

Plate 5. South-east facing section, enclosure ditch terminus [304], (scale 2m)

Plate 6. South-east facing section, Phase 2 pit, [340] and ditch [317], oblique view looking north-east, (scale 2m)

Plate 7. Overview of Phase 2 segmented ditch Group No. 11 and ditch [317], looking south-east, (scale 2m)

Plate 8. Phase 2 segmented ditch Group No. 11 showing segments [241] and [243], looking north-west, (scale 1m)

Plate 9. Phase 2 segmented ditch Group No. 11 showing segments [312] and [314], looking north-west, (scale 1m)

Plate 10. North-west facing section, Phase 2 segmented ditch Group No. 11, segment [243], (scale 0.5m)

Plate 11. Overview of Phase 4 ditch [230] and enclosure ditch [229] Group No. 4, southern corner, looking north-west, (scale 1m & 2m)

Plate 12. SSE facing section of Phase 2 ditch [230] and enclosure ditch [229], (scale 2m)

Plate 13. North-west facing section of Phase 4 enclosure ditch [159] Group No. 4, (scale 1m)

Plate 14. Overview of Phase 4 enclosure ditch [140] Group No. 4, northern corner, looking south, (scale 2m)

Plate 15. Overview of stone-lined corn-drying kiln [129], looking south-east, (2m scale)

Plate 16. South-west facing section of corn-drying kiln [129], oblique view looking east, (scale 2m)

Plate 17. Overview of corn-drying kiln [158], looking north-east, (scale 1m & 2m).

Plate 18. Corn-drying kiln [158] showing detail of stakeholes and postholes [195], also showing burnt base, looking north-west, (scale 1m)

Plate 19. Corn-drying kiln [158], south-east facing section of north-eastern quadrant showing backfill [190]- [194] and clay base [197], (scale 1m)

Plate 15. Corn-drying kiln [141], showing backfill deposits overlaying charred grain deposit [177] and daub lining, (scale 1m)

Plate 21.Corn-drying kiln [141] showing clay base [180] in northern quadrant, looking west, (scale 1m)

Plate 22. Overview of corn-drying kiln [141], looking NNW, (scale 2m)

Plate 23. Detail of corn-drying kiln [141] showing stakeholes and postholes [196], also showing burnt base, looking ENE, (scale 1m)

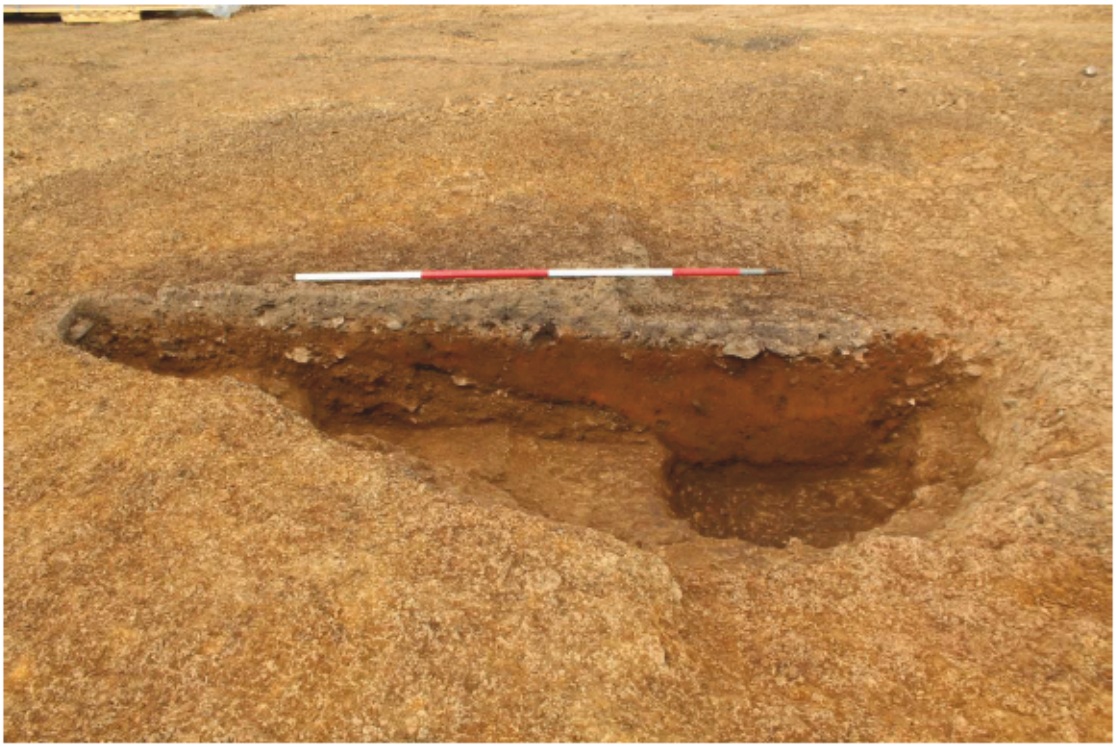


Plate 24.South facing section of corn-drying kiln [315], (scale 2m)

Plate 25. Overview of corn-drying kiln [315], looking west, (scale 1m)

Plate 26. North-west facing section of hearth [218], (scale 1m)

APPENDIX 4: POTTERY ASSESSMENT

Jenny Vaughan

Introduction

A small assemblage of 52 sherds of pottery weighing 620g was recovered during the strip, map and record excavation. The majority of the sherds came from the backfills of either the kilns or the enclosure ditch. The date range of the group is mainly 12th to 13th or early 14th century, although there were a few fragments of possibly much earlier date.

Types present (see catalogue for further details)

Three sherds of a coarse black fabric came from pit fill [105] and another from pit fill [117]. It is suggested that these may be Iron Age in date, see note by James Gerrard below.

Half of the remaining sherds, though a greater proportion of the assemblage by weight, have been classed as 'early medieval' (Fabric Group (FG) 2 in the catalogue). In this case these are coarse-gritted wares of broadly 12th century date. Some of the sherds are very similar to material from the Dog Bank kiln in Newcastle (dated to second half of the 12th century). Several rim sherds were present including one simple out-turned rim in a coarse black fabric which may be earlier than the Dog Bank types.

A group of 13 light-firing (buff and light grey) green-glazed sherds, possibly representing two vessels, came from [137]. A large sherd in a hard buff fabric came from [234]. This material is part of the widespread regional tradition of 'whitewares' (FG 4 – fabrics with a low iron content) which are dominant in the 13th to early 14th centuries.

Apart from a group of four brown gritty sherds from [231] other fragments occurred as somewhat less diagnostic singletons (see catalogue). A rim sherd of a jug from [115], unglazed and oxidised but possibly from an otherwise reduced green-glazed vessel, may be the latest piece of pottery present, perhaps 14th century, but is only a small fragment.

Discussion

Much of this small group is quite fresh and in relatively large fragments suggesting primary deposition. Even in the ditch context [137] which produced 14 small sherds, 13 of these represented only two vessels (maximum).

The presence of the early pottery is of great interest as few sites in the region have produced such material securely stratified and unmixed with later pottery and none, as far as this writer is aware, from a rural site. It should be borne in mind that the pottery being discarded may be related to the activities taking place at the kilns rather than being a domestic assemblage. However, this group is very small and any further interpretation would be highly speculative. If there is no likelihood of recovering more pottery during further work on the site the potential for analysis is limited and may not be considered appropriate. It would be desirable, however, for the group to be published in some form to make it known to any future pottery researchers in the region.

Recommendations

The fabric of the early types could be examined and described in more detail and it would also be useful, if possible, to compare directly (i.e. in the hand) with the early pottery from Saddler Street in Durham (various published descriptions of this material tend to be slightly confusing). The larger rim sherds could be drawn – i.e. those from [231], [332] and [333].

Spot dating

NB: the odd sherds which extend the date range given in some cases to 13th century are because current understanding suggests they are later but they may not be.

context	cut	group	sherds	weight	date
105			3	20	?Iron Age
115			1	3	14thC
117	pit [118].		1	10	?Iron Age
137			14	30	13th to e. 14th C
191			2	16	12thC
199			1	6	12th C?
200			5	57	12th /13th C
231			10	124	12th /13th C
234			1	75	13th/e.14th C
332			4	25	12th C
333			10	254	12th C

Fabric Groups used in the catalogue.

These are just a broad guide and in this case possibly not very helpful other than indicating the material regarded as 'early medieval'. This term means different things in different areas. Here in the north east, which is mainly aceramic pre-conquest, the author would regard 'early medieval' as covering late 11th century to 1200 (possibly a bit later) – the term 'saxo-norman' has been used in the past to describe the date range of such pottery.

FG number	comment
1	pre-medieval
2	early coarse wares - 12th C
3	other gritty wares 12th/13th
4	light firing wares
6	grey cored sandy fabrics 13th ?earlier
7	iron rich fairly fine – 13th/14th

context	cut	type	FG no.	shs.	wgt	comments
105	posthole 106	coarse black	1	3	20	Coarse black fabric with brown outer surface, 2 sherds join
115	ditch 116	ox iron rich	7	1	3	Small bit of rim with pulled spout, grey core with oxidised surfaces. An oxidised reduced greenware. Shoulders and body probably have zones of glaze.
117	pit 118	coarse black	1	1	10	?early
137	ditch 140	buff ggl	4	6	14	Glaze thinner/non-existent in parts and gritty on some. May be same ves as other sherds but from different part of the pot. All sherds are small
137	ditch 140	lt grey ggl	4	7	13	Light grey fabric with slightly pitted green/brown gl, buff int surface, all same ves.
137	ditch 140	ox/r spl gl	7	1	3	Oxidised exterior margin, fairly fine with occasional visible inclusions.
191	corn dryer 158	gritty	2	1	1	Small rim sherd, pinkish margins, thin grey core.
191	corn dryer 158	Dog Bank type	2	1	15	Pale pinkish-orange coarse gritted, looks like Dog Bank (?Fabric 3)
199	corn dryer 141	buff grey gr	3	1	6	Thin walled base with small patch glaze beneath, large inclusions breaking surface. Vessel is large or non-circular
200	corn dryer 141	coarse gritty	2	1	30	Beaded rim of small jar, small patches yellow/green glaze and pink/buff surface ext where visible through sooting. Some sooting int as well. Core dark grey
200	corn dryer 141	Dog Bank type	2	3	23	As sherd in [191], but internal surface seems to be smoothed and one sherd has run of brown and yellow glaze on exterior.
200	corn dryer 141	iron rich	7	1	4	Fairly undiagnostic grey fabric with oxidised margins/surfaces. Not coarse.
231	ditch 229	black gritty	2	3	36	Simple out-turned jar rim, coarse black fabric with light brown internal surface
231	ditch 229	Dog Bank type	2	2	34	Similar to [191] and [200], pale orange with thin mid grey core in parts, one is small fragment of rolled out rim
231	ditch 229	brown gr	3	4	36	Light brown to light orange fabric though outer half darkened and surface sooted.
231	ditch 229	rg gr	6	1	18	Good glaze cover but a hard gritty fabric, buff int margin.
234	ditch 229	buff	4	1	75	Large sherd fairly hard buff fabric with a few small spots yellow glaze, some blackening both int and ext. Fine sand inclusions.
332	corn dryer 315	coarse gritty	2	1	10	Simple beaded rim, grey fabric with some thin light brown margins but surfaces darker ?from fire
332	corn dryer 315	gritty	2	3	15	Small joining sherds of sooted base, a bit finer than the rim. Buff/pink internal margin
333	corn dryer 315	gritty	2	7	74	Includes rim sherds, some joining, everted with expanded outer edge. Fabric black in parts with paler brownish surfaces though much discoloration but one sherd becomes more like the large base sherds in fabric on one side. These may all be from the same ves part of which has been discoloured/burnt.
333	corn dryer 315	ox gritty	2	2	147	Joining base sherds, orange/brown with variable mid-grey core. Like a finer Dog B. Some sooting ext.
333	corn dryer 315	sandy grey	6	1	33	Variable mid grey core with lighter margins/surfaces. Abraded compared to other sherds. Not really diagnostic.

Abbreviations have been kept to a minimum to avoid long explanations and because this is a small group where the catalogue could form part of the 'types present' section.

ext external/exterior
ggl green glazed
gr gritty
int internal
ox oxidised (ox/r = oxidised/reduced i.e. part oxidised)

ves vessel

Pre-medieval Pottery

James Gerrard (Newcastle University)

Three sherds (19.5g) of hard, dark-grey to black pottery from fill [105] of pit [108] and another from fill [117] of pit [118]. Visible inclusions include sparse and poorly sorted large sub-rounded black rock fragments approx. 2mm x 2mm and sparse sub-angular quartz grains 1mm x 1mm.

These body sherds do not betray the form of vessel(s) they are derived from. Probably it was a closed, jar-like pot. It is difficult to put a date on these sherds. At the widest level we might put them somewhere between the end of the Bronze Age and the Norman Conquest. As the medieval pottery specialist has ruled out the possibility that these are Anglo-Saxon, the balance of probability suggests that these are of Late Iron Age or Early Roman date, although I would not wish to state this categorically without further evidence.

APPENDIX 5: FIRED CLAY ASSESSMENT

Berni Sudds

Introduction

A total of 92 fragments of fired clay were recovered from the excavations, weighing 8633g. The vast majority was derived from the backfill of three early medieval corn-drying kilns, the remaining fragments being recovered from contemporary Phase 4 pit and ditch fills (Table 1). The material is in very good condition, particularly the large assemblage from kiln [141], comprised of large diagnostic pieces with well-preserved surfaces and withy impressions.

Feature	Context	Total number	Total Weight (g)
Corn-drying kiln [141]	173	65	7316
	199	2	162
	200	1	17
Corn-drying kiln [158]	191	6	145
Corn-drying kiln/ furnace [315]	333	9	899
Enclosure ditch [159]	161	3	38
Enclosure ditch [229]	231	3	20
Pit [274]	273	3	36

Table 1: Distribution of the fired clay assemblage.

Corn-drying kilns

The largest assemblage of fired clay was derived from the backfill of oven [141], dated to 12th to early 13th century. Most of the material was derived from the primary fill (173), likely representing the in-situ remnants of the collapsed super-structure. Two of the three fragments from the uppermost fills of the feature, (199) and (200), represent re-deposited fragments of the same super-structure but the third fragment is quite heavily abraded, possibly originating from elsewhere. The fabric is comprised of poorly mixed marbled orange and cream clay, although the assemblage is yellowish buff to mid orange in overall appearance. A small number of fragments have a reduced grey core or patchy reduction to the surface and a single fragment is dark grey throughout. The clay contains poorly dispersed occasional to abundant sand mostly under 0.5mm, absent in some areas and occurring as dense lenses in others. Moderate white mica, occasional organics, red iron ore and possible calcareous inclusions are also present.

There are multiple withy impressions, all in the round and largely running parallel to each other, although a smaller number are set at right angles to the rest. The withy impressions range in diameter from 11 to 36 mm and occur directly adjacent to one another or up to 50 to 60mm apart. In larger fragments, some curvature is evident lengthwise. Finished surfaces are variable, some uneven and undulating, others flat, concave, or slightly convex, possibly representing fragments of both the internal and external faces of the oven. They are all roughly finished with visible wiping marks and organic impressions from straw or grass. Some fine cracking is evident. With such a fragmentary assemblage, any reconstruction is at best speculative. Taken together with the evidence of regularly

spaced stake holes around the perimeter of the oven, however, it is possible the super-structure was comprised of vertical stakes, possibly tapering to form a dome, interwoven and strengthened with multiple horizontal withies, and covered internally and externally in clay.

Smaller assemblages were retrieved from kilns [158] and [315], in both cases from the penultimate backfills. The few fragments from oven [158] occur in a similar marbled fabric to that used for oven [141], but containing more abundant rounded red iron oxide and being harder, likely heated to higher temperature. The few withy impressions are comparable to those from [141], perhaps suggesting the oven had a similar construction. The material recovered from [315], however, differs from the rest. The fabric is more homogenous, fine and mid orange in colour, although also exhibits pockets of sand. Some fragments refit and appear to form a block of clay with slightly rounded corners and arrises, possibly representing a crudely formed clay 'brick'. Whether this formed part of the oven/ furnace super-structure or internal furniture is unclear.

Fired clay from other features

With the exception of the material from enclosure ditch [229], possibly representing re-deposited fragments from oven [141], the remaining fired clay is fragmentary and non-diagnostic. The abraded fragments from enclosure ditch [159] occur in a cream and orange friable silty fabric with no inclusions or finished surfaces. The three fragments from pit [274] are also non-diagnostic, occurring in a cream to pale pink silty clay with sparse white mica and iron oxide.

Summary and recommendations

Corn-ovens are a more common feature of medieval settlements in the north of Britain, where the wetter climate required the drying of grain to be facilitated (Steane 1984,262). The examples on site coincide with a period of deteriorating climate, manifesting in declining temperatures and heavy rainfall at harvest time (Atkins and Webster 2012, 286-7). The preservation of the East Rainton examples is good, and together with fragments of the collapsed super-structure, provide valuable information regarding construction. Unfortunately, the dating evidence is not available to determine if there is any chronology to the examples on site. It may seem reasonable to suppose that the stone lined oven represents a technologically superior replacement of the clay and timber examples, but this is far from certain and difficult to substantiate. Further work should seek to compare the current ovens with contemporary examples in the region, including those at Peter's Gate and Low Crosby in Cumbria, and more widely across medieval Britain (Railton *et al.* 2014; Jackson *et al.* 2015). The East Rainton examples will add to an understanding of the appearance of corn-driers during this period and consequently to a broader appreciation of how they develop over time.

Atkins, R., and Webster, M., 2012. 'Medieval corn-driers discovered on land probably once part of Repton Manor, Ashford'. Archaeologia Cantiana Vol.132, 275-289.

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Railton, M., Bradley, J., Millar, I., Stoakley, M., Jackson, D., O'Meara, D. and Hall, A., 2014. 'Peter Gate, Cumwhinton: Archaeological Investigation of a Medieval Rural Site', *Transactions C and WAAS* **14**, pp. 91-95.

APPENDIX 6: LITHIC ASSESSMENT

Barry Bishop

Introduction

Four struck flints were recovered from the archaeological excavations. They have been individually catalogued which includes details of raw materials, condition and, where possibly a suggested date range (Table 1). This text summarizes the data presented in the catalogue; its aims are to quantify and describe the material, assess its significance and to identify any further work needed in order that the material can achieve its full research potential. All metrical descriptions follow the methodology established by Saville (1980).

Description

The assemblage comprises three flakes and a prismatic blade. Two of the struck flakes and the blade were made from an opaque grey flint with frequent lighter cherty patches. This is typical of flint from the White Chalk Formations of the Lincolnshire and Yorkshire Wolds, the nearest outcrops of which occur at least 90km to the south, and these must have been carried to the site. The remaining flake has been made from a semi-opaque reddish brown flint. It has a worn thermally scarred surface and was most probably made using flint cobbles such as are present in the glacial deposits that mantle the area.

The assemblage contains no typologically diagnostic pieces but the prismatic blade from context [192] can be confidently dated on technological grounds to the Mesolithic or Early Neolithic periods. The flake from context [292] is less datable but derives from careful core preparation and could easily be contemporary with the blade. The flake from context [164] is more crudely struck and in many ways quite typical of later prehistoric industries, particularly those dating to the late second and first millennia BC. Its recovery, in a good condition, from a potentially Iron Age ditch could indicate that it is at least broadly contemporary with the ditch. However, it is perhaps more likely that it is a thick waste flake from mass reduction or core shaping and therefore could belong to an earlier period, perhaps even being closely contemporary with the blade. The remaining piece, the small flake from context [137], has no chronologically sensitive traits and could belong to any prehistoric period.

Discussion

The blade at least indicates Mesolithic or Early Neolithic activity at the site and it is most likely that the other pieces made from imported Wolds flint are roughly contemporary, although one of the flakes could possibly represent a rare example of Iron Age flintworking. The small size of the assemblage indicates that the earlier prehistoric occupation, or at least its use of flint, were low-key and probably very temporary, the flintwork most plausibly representing a short period of activity by an otherwise mobile group.

Recommendations

Due to the small size of the assemblage and lack of diagnostic pieces this report and accompanying catalogue is all that is required for the purposes of archiving and no further metrical or technological

analyses are warranted. The assemblage does, however, provide evidence for prehistoric activity at the site and can contribute to wider appreciations of prehistoric landscape use in the area. It is therefore recommended that a short account of the assemblage, which can largely be based on this report, should be included within any published accounts of the excavations.

Context	Ref.	Flake	Prismatic blade	Unworked burnt stone (no.)	Unworked burnt stone	Colour	Cortex	Condition	Suggested Date	Description
137	SF 5	1				Opaque reddish brown	Ancient thermal scar	Slightly chipped	Undated	Small mostly cortical flake with a wide dihedral striking platform. 11x18x7mm
164	SF 6	1				Opaque mottled grey	Hard, rough	Good	Undated	Thick flake with a plain striking platform and multi-directional dorsal scars. 37x42x13mm
192	SF 3		1			Opaque mottled grey	None	Slightly chipped	Meso / ENeo	Prismatic but rather thick blade with a finely trimmed striking platform. Distal end missing. >36x13x5mm
292	SF 4	1				Opaque mottled grey	None	Slightly chipped	Meso - EBA	Small platform trimming flake with a narrow, trimmed striking platform. 14x24x4mm

Table 1: Catalogue of flint assemblage

Bibliography

Saville, A. 1980 On the Measurement of Struck Flakes and Flake Tools. *Lithics* 1, 16-20.

APPENDIX 7: CHARCOAL AND CHARRED PLANT MACROFOSSIL ASSESSMENT

M. Vitolo & S. Adams (University of Reading)

Introduction

This report summarises the findings arising out of the charcoal assessment undertaken by Quaternary Scientific (University of Reading) in connection with the archaeological investigations at East Rainton, Sunderland (site code: ERS16) site. Quaternary Scientific were commissioned by PCA Archaeology to undertake the assessment.

Sampled features dated to Phases 2 and 4 of the site's occupation and included hearths, ditches, corn drying kilns and one pit. In addition, fourteen buckets of material was taken from fill [177] of corn-drying kiln [141] (sample <87>), which contained a very high concentration of charred grains. This report aims to assess the significance and potential of the plant macrofossils and charcoal to contribute to discussions on diet, economy, vegetation environment, fuel selection and use. It also aims to assess the suitability of the plant material for AMS dating.

Methods

Flots and relative charcoal fragments from 28 bulk soil samples and an unprocessed sample taken during excavations at East Rainton were submitted by Pre-Construct Archaeology for post-excavation assessment.

A 1L subsample from sample <87> was received unprocessed. The subsample was processed by flotation, using a 500µm for the residue and 250µm for the flot. The flots were scanned under a stereozoom microscope at 7-45x magnifications and their contents recorded (Tables 1 & 2). Where necessary, flots were subsampled and 100ml of the volume scanned. Provisional identification of the charred remains was based on observations of gross morphology and surface cell structure and, when required, comparative reference material and published reference atlases (Cappers *et al.* 2006; Jacomet 2006) were consulted. Quantification was based on the approximate number of individuals. Nomenclature follows Stace (1997) for wild species and Zohary and Hopf (1994) for cereals.

Charcoal fragments were selected from productive samples and were fractured along three planes (transverse, radial and tangential) according to standardised procedures (Gale and Cutler 2000; Leney and Casteel 1975). Specimens were viewed under a stereozoom microscope for initial grouping, and an incident light microscope at magnifications up to 400x to facilitate identification of the woody taxa present. Taxonomic identifications were assigned by comparing suites of anatomical characteristics visible with those documented in reference atlases (Hather 2000; Schoch *et al.* 2004; Schweingruber 1990). Genera, family or group names have been given where anatomical differences between taxa are not significant enough to permit more detailed identification. Nomenclature used follows Stace (1997), and taxonomic identifications of charcoal are recorded in Table 3. In the text, except for the Maloideae subfamily, all the taxa are referred to using their English common names.

Results and Interpretation of the Charcoal and Charred Plant Macrofossil Assessment

Charred Plant Macrofossils

The volume of the flots ranged from 5 to 900ml in volume and contained up to 40% uncharred material of modern roots and recent seeds of blackberry (Rubus sp.), common knotgrass (Polygonum aviculare), fool's parsley (Aethusa cynapium) and elder (Sambucus sp.) as well as goosefoots (Chenopodiceae) and sedges (Carex sp.). Charcoal fragments were present within all of the flots and insect remains were identified in pit [118] and hearth [143]. Single small mammal bones were identified in the flots from pit [118] and hearth [342]. Pit [118] also contained several fragments of coal, as did ditch [116] where they were occasionally present. Charred plant macrofossils were present within all of the flots, excluding hearth [348], and preservation of the remains ranged from poor to moderate.

Charcoal

Charcoal fragments were recovered from a total of 26 samples. Abundance varied from low to high. Preservation was generally poor to moderate. Most charcoal fragments displayed signs of post depositional sediment encrustations and percolation, due to fluctuations in the ground water level. Distortion of the anatomical characters and vitrification also occurred commonly. Vitrification happens when the wood anatomy fuses, displaying a glossy glass-like appearance. Although it is generally linked to the use of high temperatures, experimental evidence has shown that this is not a sufficient factor for charcoal to become vitrified and that a secure cause is not yet known (McParland *et al.* 2010). Radial cracks were occasionally present, especially on oak; they have been linked to the presence of moisture in the wood (Fiorentino and D'Oronzo 2010) and could indicate the use of fresh wood for fuel. The recovery of round wood fragments from most contexts might indicate deliberate collection of small branches or twigs from the local landscape to use for fuel.

Phase 2

Samples <32> [171], <34> [184], <49> [211], <50> [213], <65> [247], <98> [292], <106> [238] and <107> [311].

All the samples from Phase 2 originated from ditch fills and ranged in size from 30 to 40 litres.

Charred Plant Macrofossils

Charred plant macrofossils were present within all of the flots from Phase 2 (Table 1). They were rare (1-10) from enclosure ditches [160] and [202] and ditch [239] and occasional (11-50) within ditch [312], charred plant macrofossils were frequent (51-250) within all of the other Phase 2 features. Preservation of the charred plant macrofossils from Phase 2 was generally moderate, although the remains within enclosure ditch [160] were poorly preserved whilst ditch [239] contained well-preserved material.

Cereals

Cereal caryopses were identified within all sampled contexts from Phase 2. The presence of barley (Hordeum sp.), wheat (Triticum sp.) and oat (Avena sp.) was recorded as well as a small number of indeterminate grains. Several of the barley grains from ditches [182] and [293] retained the vertical indentations from the hulls indicating they were of the hulled variety. The twisted nature of a number of grains in ditch [293] indicates the cultivation of six-rowed hulled barley in this period. Further identification of the wheat caryopses was difficult due to the vast morphological variation within the genus and the absence of the more diagnostic chaff. One wheat grain within ditch [312] retained the impressions of the glumes indicating the presence of glume wheat whilst a short, rounded wheat grain from ditch [182] was indicative of the free-threshing variety. It was noted that the cereal remains from ditch [182] were dominated by barley accompanied by sporadic grains of wheat and oat. No cereal chaff was identified within the Phase 2 flots.

Arable Weeds

Arable weeds were identified within enclosure ditches [202] and [209] and ditches [293] and [312]. Common knotgrass is associated with the cultivation of dry sandy soils. Other common weeds of cultivation, including campions (Silene sp.), sedges and bedstraw (Galium sp.) were recorded.

Charcoal

Phase 2 contexts generally produced small amounts of charcoal, except for enclosure ditch [182], from which over 100 fragments were recovered. Most of the woody taxa were identified as oak, others as hazel/alder and a few as tentative or definite alder. Post depositional sediment encrustations and vitrification were common and in many instances hindered identification of fragments as alder or hazel, which display a similar wood anatomy. Gorse/broom and cherry/blackthorn occurred less frequently. A few round wood fragments from various taxa were noted; however measurements of diameter and growth ring counts could not be made, due to the fragments being incomplete.

Phase 4

Samples <6> [115], <7> [117], <10> [123], <20> [139], <23> [144], <40> [131], <41> [128], <42> [132], <45 >[132], <52> [217], <60> [121], <61> [192], <62> [193], <85> [198], <87> [177], <94> [234], <112> [341], <113> [333], <114> [333], <117> [337] and <119> [347].

Sampled features from Phase 4 included corn-drying kilns [129], [158] and [315], hearths [121], [143], [218], [342] and [348], pit [118] and several ditches. Sample size ranged from 20 to 40 litres of soil.

Charred Plant Macrofossils

Charred plant macrofossils were present within all of the sampled features from Phase 4, excluding that of hearth [348] (Table 2). They were rare (1-10) in ditch [116] and hearths [121], [218] and [342] and from fill [337] of corn-drying kiln [315], occasional (11-50) in hearth [143], enclosure ditch [140] and corn-drier fills [131], [193] and [333] and frequent (51-250) in pit [118], enclosure ditch [229] and

corn-drier fills [131], [191] and [192]. Charred plant macrofossils were abundant (>250) in the flots from fills [128] and [132] of corn drying kiln [129] and fill [198] of corn-drier [141] as well as within enclosure ditch [203].

Corn-Drying Kilns [129], [141], [158] and [315]

Cereal caryopses were abundant within the corn-drying kilns and were largely of barley, wheat and oat. These taxa were only not identified in fill [337] of kiln [315], the plant remains of which consisted of three indeterminate cereal grains. Wheat was largely of the free-threshing variety and the presence of bread wheat (Triticum aestivum) rachis in corn-drying kilns [129] and [141] suggests that the grains likely derive from this variety. A small number of hulled grains of wheat and barley were identified from kilns [129] and [158]. Rye (Secale cereale) grains were positively identified from corn-drying kilns [129], [158] and [315]. A single rachis of rye was identified within corn-drying kiln [141] despite no grains being attributed to the cereal in this context. It was noted that free-threshing wheat was dominant in fill [198] of corn-drying kiln [141] accompanied by sporadic grains of oat and barley. Fill [177] of the same feature contained a pure assemblage of oat grains. A number of floret bases confirm the presence of cultivated oat (Avena sativa), several of which were still attached to the grains.

Arable weeds were frequent within the majority of the fills of the corn-drying kilns. Similar to Phase 2, common knotgrass indicates the cultivation of dry sandy soils, whilst the presence of stinking mayweed (Anthemis cotula) implies arable expansion onto heavy clay soils. Stinking mayweed is also strongly associated with the cultivation of free-threshing wheat (Giorgi 2006). Nipplewort (Lapsana communis), also a weed of heavy clay soils, was identified in several samples as well as corn gromwell (Lithospermum arvense), indicative of chalkland cultivation (Salisbury 1961). Other arable weeds included common hemp-nettle (Galeopsis tetrahit), buttercup (Ranunculus acris-type), mustard (Brassica sp.) and fat hen (Chenopodium album) as well as docks, sedges, wild grasses (Poaceae) and small legumes (Fabaceae).

Hazelnut (Corylus avellana) shell fragments were identified within all of the corn-drying kilns, excluding kiln [158]. A significant number of cultivated legumes (Vicia/ Lathyrus/ Pisum) were present in kiln [141] as well as a single flax (Linum sp.) seed.

Ditches [116], [140], [203], [229] and Pit [118]

The cereal remains from the Phase 4 ditches and pits were similar to those of the corn-drying kilns, with free-threshing wheat, barley, oat and rye recorded, although they were less well-preserved and no cereal chaff was present. Arable weeds were occasional and consisted of stinking mayweed, nipplewort, knotgrass, fat hen, knotweed (Persicaria sp.), docks and small grasses and legumes. No other plant remains were recorded from the ditch and pit features from this period.

Hearths [121], [143], [218], [342] and [348]

Charred plant macrofossils were rare/ occasional within the Phase 4 hearths and preservation of the remains was largely poor. The majority of the cereal grains were indeterminate although the presence of hulled barley, wheat and oat was noted along with the possible presence of rye in hearth [218]. Tubers of onion couch-grass (Arrenatherum elatius var. bulbosum) were occasional within hearth [342] as well as several seeds of stinking mayweed. Charred bramble (Rubus sp.) seeds were recorded from hearth [143] and [218] with one possibly belonging to that of raspberry (Rubus cf. idaeus).

Charcoal

Nearly all sampled Phase 4 deposits yielded charcoal fragments, although abundance was variable. Eight corn drying kiln fills yielded charcoal, mostly oak, hazel/alder and alder. Gorse/broom, Maloideae and cherry/blackthorn occurred much less commonly. Sample <85> from corn drying kiln [141] contained several >8mm fragments. In general, hearth fills yielded a good amount of charcoal fragments. Preservation was however still poor to moderate, with much sediment encrustation noted. No new taxa were noted; oak and hazel/alder were still the most common. Pit fill [117] yielded generally well preserved charcoal, with not as many signs of sediment encrustations or vitrification. This context was dominated by oak, with cherry/blackthorn and hazel/alder as minor components. Finally, the ditch fills yielded charcoal assemblages of variable size and preservation, although traces of sediment percolation, distortion and vitrification were common. Oak was generally dominant, although both hazel and alder occurred frequently.

Table 1: Phase 2 Flot quantification (* = 1-10, ** = 11-50, *** = 51-250, **** = >250) (+ = poor, ++ = moderate, +++ = good).

Sample Number	Context	Context Type and Parent Context	Weight (g)	Flot Volume (ml)	Volume Scanned (ml)	Uncharred (%)	Sediment (%)	Seeds Uncharred	Charcoal >4mm	Charcoal 2-4mm	Charcoal <2mm	Crop Seeds Charred	Identifications	Preservation	Weed Seeds Charred	Identifications	Preservation
32	171	Enclosure Ditch [160]	14	30	30	10	60			*	**	*	*Cerealia* indet.	+			
34	184	Enclosure Ditch [182]	20	50	50					*	***	***	*Hordeum vulgare* (hulled) *Triticum* sp. (rounded) *Avena* sp.	++			
49	211	Enclosure Ditch [202]	5	5	5	10	50			**	**	*	*Cerealia* indet. *Hordeum vulgare* (hulled) *Triticum* sp.	++	*	*Carex* sp. *Galium* sp.	++
50	213	Enclosure Ditch [202]	29	55	55			Chenopodiaceae * *Ranunculus* sp. *	**	***	***	*	*Hordeum* sp. (1)	++			
65	247	Enclosure Ditch [245]	9	15	15	5	60		*	***	***	*	*Cerealia* indet. (2) Hordeum sp. (2) cf. Avena sp. (1)				
98	292	Ditch [293]	33	50	50	10	40		**	***	****	***	*Triticum* sp. *Avena* sp. *Hordeum vulgare* (twisted) (hulled) *Cerealia* indet.	++	*	*Polygonum aviculare*	++
106	238	Ditch [239]	<1g	<5	<5	20	60			*	**	*	*Avena* sp. (2)	+++			
107	311	Ditch [312]	53	60	60	5	80	Chenopodiaceae *		**	**	**	*Triticum* sp. (hulled) *Hordeum* sp. *Avena* sp. *Cerealia* indet.	++	*	*Silene* sp.	++

Table 2: Phase 4 Flot quantification (* = 1-10, ** = 11-50, * = 51-250, **** = >250) (+ = poor, ++ = moderate, +++ = good).**

Sample Number	Context	Context Type and Parent Context	Weight (g)	Flot volume (ml)	Volume scanned (ml)	Uncharred (%)	Sediment (%)	Seeds Uncharred	Charcoal >4mm	Charcoal 2-4mm	Charcoal <2mm	Crop Seeds Charred	Identifications	Preservation	Weed Seeds Charred	Identifications	Preservation	Other Charred Botanicals	Identifications	Preservation	Insects, Fly Pupae etc.	Small Mammal Bone	Industrial Debris
6	115	Ditch [116]	6	10	10	20	60	Caryophyllaceae *Rubus* Chenopodiaceae		**	***	*	*Triticum* sp. (rounded) [1] *Cerealia* indet. [1]	++									**
7	117	Pit [118]	117	130	100	5	50		***	****	****	***	FTW *Avena* sp. *Hordeum* sp. *Cerealia* indet. cf. *Secale cereale*	+	**	Poaceae (small) *Polygonum aviculare Chenopodium album Rumex* sp. Caryophyllaceae	++				*	*	*
10	123	Hearth [121]	183	520	100	5	5		****	****	****	*	*Triticum* sp. (rounded) (1) *Cerealia* indet. (1)	++									
20	139	Enclosure Ditch [140]	6	20	20	30	50			**	***	**	*Cerealia* indet. *Avena* sp. *Hordeum* sp.	+	*	*Persicaria* sp.	++						
23	144	Hearth [143]	2	15	15	5	20	Chenopodiaceae *Polygonum aviculare Rubus Carex* sp.		***	***	**	*Triticum* sp. (1) *Avena* sp. (1) *Cerealia* indet. cf. *Avena* sp. *Triticum/ Hordeum* (1)	+	*	Fabaceae (small)	++	*	*Rubus* sp.	+++	*		
40	131	Corn-Drying Kiln [129]	4	5	5	40	20	*Rubus*		*	**	**	*Avena* sp. *Hordeum* sp. *Triticum* sp. (rounded) cf. *Secale cereale*	+++	*	*Brassica* sp. Poaceae (small)	+++						
41	128	Corn-Drying Kiln [129]	45	130	100			*Polygonum aviculare*			**	****	*Hordeum vulgare Avena* sp. *Triticum* sp. FTW *Cerealia* indet. *Secale cereale Avena sativa*	+++	***	*Anthemis cotula* Fabaceae (small) *Carex* sp. *Ranunculus acris*-type *Persicaria* sp. *Plantago lanceolata Lapsana*	+++	*	*Corylus avellana* shell fragment (1) *Avena sativa* floret base (1) *Secale cereale* rachis (1)	++			

Sample Number	Context	Context Type and Parent Context	Weight (g)	Flot volume (ml)	Volume scanned (ml)	Uncharred (%)	Sediment (%)	Seeds Uncharred	Charcoal >4mm	Charcoal 2-4mm	Charcoal <2mm	Crop Seeds Charred	Identifications	Preservation	Weed Seeds Charred	Identifications	Preservation	Other Charred Botanicals	Identifications	Preservation	Insects, Fly Pupae etc.	Small Mammal Bone	Industrial Debris
																communis Festuca/ Lolium							
42	132	Corn-Drying Kiln [129]	27	80	80	5	5	*Sambucus*	*	***	***	****	*Hordeum* sp. *Triticum* sp. *Avena* sp. *Hordeum vulgare* (hulled) FTW	+++	***	*Bromus* sp. Poaceae (small) Fabaceae (small) *Ranunculus acris*-type Apiaceae *Anthemis cotula* cf. *Lapsana communis Persicaria* sp. *Carex* sp.(p) *Chenopodium album Rumex* sp.	+++	*	*Triticum aestivum* rachis (3) *Cerealia* culm node *Avena sativa* floret base (1)	+++			
45	205	Corn-Drying Kiln [203]	30	40	40	10	60		*	**	***	****	FTW *Secale cereale Avena* sp. *Hordeum vulgare*	++	**	Fabaceae (small) Lamiaceae *Lapsana communis* Poaceae (small) *Anthemis cotula*	++						
52	217	Corn-Drying Kiln [218]	80	180	100	5	5	Chenopodiaceae *Rubus Polygonum aviculare*	***	****	****	*	*Hordeum* sp. (6) *Hordeum vulgare* (hulled) (2) *Cerealia* indet. (3) cf. *Secale cereale* (1)	+	*	*Persicaria* sp.	++	*	*Rubus* cf. *idaeus*	+++			
60	191	Corn-Drying Kiln [158]	9	20	20	20	30		*	**	***	***	*Triticum* sp. FTW *Avena* sp. *Hordeum* sp. (twisted) *Secale cereale*	++	**	*Lithospermum arvense Rumex* sp. *Anthemis cotula Lapsana communis Atriplex* sp. *Chenopodium album*	++						
61	192	Corn-Drying Kiln [158]	28	55	55	20	40	*Aethusa cynapium Cirsium* sp.		**	****	***	*Triticum* sp. (hulled) *Cerealia* indet. *Hordeum* sp. FTW cf. *Secale cereale Avena* sp.	++	***	*Chenopodium* sp. cf. *Lapsana communis Anthemis cotula* Poaceae (small)	++	*	Rachis internode indet.	+			

Sample Number	Context	Context Type and Parent Context	Weight (g)	Flot volume (ml)	Volume scanned (ml)	Uncharred (%)	Sediment (%)	Seeds Uncharred	Charcoal >4mm	Charcoal 2-4mm	Charcoal <2mm	Crop Seeds Charred	Identifications	Preservation	Weed Seeds Charred	Identifications	Preservation	Other Charred Botanicals	Identifications	Preservation	Insects, Fly Pupae etc.	Small Mammal Bone	Industrial Debris
																Silene sp. *Lithospermum arvense Brassica* sp. *Rumex* sp. *Polygonum aviculare*							
62	193	Corn-Drying Kiln [158]	3	5	5	30	30	Chenopodiaceae		*	**	**	*Avena* sp. *Secale cereale* FTW *Cerealia* indet. *Hordeum* sp.	++	***	Poaceae (small) *Chenopodium album Anthemis cotula Lithospermum arvense Rumex* sp.	++						
85	198	Corn-Drying Kiln [141]	273	900	100	5	5	*Rubus* sp.	****	****	****	****	*Avena* sp. FTW *Hordeum* sp. *Cerealia* indet. *Avena sativa*	+++	***	*Persicaria* sp. *Anthemis cotula* Poaceae (small) *Rumex* sp(p). Fabaceae (small) *Ranunculus acris*-type	++	***	*Linum* sp. *Corylus avellana* shell fragment (1) *Vicia/Lathyrus/ Pisum Triticum aestivum* rachis (11) *Avena sativa* floret base (13) *Secale cereale* rachis (1) *Cerealia* culm node (3)	++			
87	177	Corn-Drying Kiln [141]	142	450	300	0	20					****	*Avena* sp., *Avena sativa*	+++				***	*Avena sativa* floret basis	++/ +++			
94	234	Enclosure Ditch [229]	33	40	40			Chenopodiaceae		*	***	***	*Hordeum* sp. *Avena* sp.	++	**	*Rumex* sp. *Anthemis cotula*	++						
112	341	Hearth [342]	30	40	40	10	60	*Polygonum aviculare* *		***	***	*	*Cerealia* indet.	+	**	*Arrhenatherum elatius* var.	+++					*	

Sample Number	Context	Context Type and Parent Context	Weight (g)	Flot volume (ml)	Volume scanned (ml)	Uncharred (%)	Sediment (%)	Seeds Uncharred	Charcoal >4mm	Charcoal 2-4mm	Charcoal <2mm	Crop Seeds Charred	Identifications	Preservation	Weed Seeds Charred	Identifications	Preservation	Other Charred Botanicals	Identifications	Preservation	Insects, Fly Pupae etc.	Small Mammal Bone	Industrial Debris
																*bulbosum*Tubers *Anthemis cotula*							
113	332	Corn-Drying Kiln [315]	89	160	100	5	70	*Polygonum aviculare* *	**	***	****	***	*Cerealia* indet. FTW *Secale cereale Avena* sp. *Hordeum vulgare*	++	**	Fabaceae (small) *Polygonum aviculare*	++	**	*Corylus avellana* shell fragment *Cerealia* culm node	++			
114	333	Corn-Drying Kiln [315]	86	210	100	10	80	Chenopodiaceae *	*	***	***	**	*Avena* sp. *Cerealia* indet. FTW *Hordeum* sp.	+	*	*Galeopsis tetrahit Rumex* sp.	++	*	*Corylus avellana* shell fragment	++			
117	337	Corn-Drying Kiln [315]	75	130	100	5			****	****	****	*	*Cerealia* indet. (3)	+									
119	347	Hearth [348]	25	50	50	5	20	*Polygonum aviculare* *	**	***	****												

Table 3: Charcoal data (Key cf: compares with, rw:round wood, dist:distorted, V: vitrified, pdse:post-depositional sediment encrustations, RC:radial cracks)

Sample Number	Context	Phase	*Quercus* sp.	cf. Maloideae group	Prunoideae *Prunus* sp.	*Corylus avellana*	*Alnus* sp.	*Corylus/Alnus* sp.	Leguminosae	indeterminate
			oak	hawthorn, whitebeam, rowan, apple, pear	cherry/blackthorn	hazel	alder	hazel/alder	gorse/broom	
6	115	4								2
										1dist, 1 V
7	117	4	7		1			1		1
			some rw					rw		dist
10	123	4	7					3		
			1rw					2 rw, pdse		
20	139	4	3		rw					V
			RC							
23	144	4	1			1 cf	2 cf	3		3
						pdse	pdse	pdse		dist. V, 2 RC
32	171	2	5				1	2		2
			pdse					1 rw, pdse		1 knot/V, 1 dist
34	184	2	15							
			2rw							
40	131	4	10							
			4rw							
41	128	4	5	1			1	2		1
pdse, mostly rw fragments			2rw	rw			rw	rw		dist
42	132	4	1				9			
			rw				rw, pdse, V			
45	205	4	2			3	1cf	3		1
			pdse			dist,pdse	pdse	dist,pdse		knot
49	211	2	2		1			1		2
50	213	2	4		cf 3					3
					rw					2 V
52	217	4	7			1		2		
			RC					pdse		
60	191	4	1					2		1
			rw					rw		V
61	192	4	2 (1cf)			5				2
			rw			rw				V
65	247	2	9							1
			I knot							knot
85	198	4					3	7		
fairly large fragments, all rw/twigs							rw, V	rw, V, pdse		
87	1777	4					10			
							rw			
94	234	4	5 cf					3		2
pdse			dist					1 rw		dist

Sample Number	Context	Phase	*Quercus* sp.	cf. Maloideae group	Prunoideae *Prunus* sp.	*Corylus avellana*	*Alnus* sp.	*Corylus/Alnus* sp.	Leguminosae	indeterminate
			oak	hawthorn, whitebeam, rowan, apple, pear	cherry/blackthorn	hazel	alder	hazel/alder	gorse/broom	
98	292	2	5 (+1cf)					2	1	1
pdse										
106	238	2	3					2		5
pdse			1 rw					rw		1 V
107	311	2	2	1		1cf		1		1
						rw				V
112	341	4	7				1 cf	2		
pdse, vitrified			1 rw, 1 RC							
114	333	4	3					2	1 (3cf)	1
								dist, 1 rw	1 rw, 3 dist	dist
117	337	4	4 (+1cf)		1			1		3
			1 rw							dist/RC
119	347	4	1			2		3		4
			pdse					pdse		2 dist, 2 V

Significance and Potential of the Results

Charred Plant Macrofossils

The north-east of England is relatively well-represented archaeobotanically in the medieval period (Hall and Huntley 2007), although there is a strong bias towards large urban centres such as Durham and Newcastle upon Tyne. Archaeobotanical material from medieval rural sites is lacking and Hall and Huntley (2007, 185) have suggested that any well-dated plant assemblages from the region are worthy of archaeobotanical consideration. Comparable rural sites for East Rainton are available from the deserted medieval village of Thrislington (Donaldson 1976), 10 miles to the south, and from contemporary corn-drier sites at Peter's Gate and Low Crosby in Cumbria (O'Meara and Hall 2014; Jackson *et al* 2015). The multi-period occupation of East Rainton may provide an insight into changes in the arable economy over time making it comparable to other multi-faceted rural sites in the north such as Wharram Percy (Arthur 1979; Carruthers 2000).

The charred plant macrofossils indicate that the arable economy at East Rainton was reliant on multi-cropping, likely employed to secure against famine in the event of crop failure and to diversify the diet. Crop diversification appears to have been increased in Phase 4 with the introduction of rye and cultivated legumes to the diet. The construction of several corn-dryers in the period is also suggestive of the expansion of agriculture at the site. The absence of large quantities of chaff and germinated grains from these structures stipulates that they were used for drying grain prior to storage rather than for malting or threshing purposes. The presence of stinking mayweed indicates the cultivation of heavy clay soils, likely based on the local clay loam soils surrounding the River Wear. Cultivation of such soils is often associated with the expansion of agriculture, particularly from the Roman period onwards (Pelling 2011). The introduction of stinking mayweed into the Phase 4 assemblage at East Rainton is suggestive of expansion onto previously untilled soils and a possible growth in the arable economy of the site at this time. A prevalence for barley was noted in Phase 2 whilst Phase 4 saw the potential domination of free-threshing wheat, however this observation is tentative and full analysis and quantification would be required to determine if such a shift in the agricultural regime exists.

Sample <87> stood out for the extremely high concentration of charred grains. Although normally the collection of 40L of soil per sample is recommended for the assessment of charred plant macrofossils, in this case processing of the full sample might not be necessary. However, given the homogeneity of the subsample, which only yielded oat grains, it would be advisable to process an extra litre, preferably from another bucket or from a different spot in the deposit, to ascertain that such homogeneity occurs across the whole deposit and is not due to chance.

The presence of hazelnut shell fragments, bramble and possible raspberry seeds in the Phase 4 deposits may indicate the exploitation of wild plant resources to diversify the diet. Alternatively, the remains may have been transported to site along with the fuel wood and

subsequently burnt. Further investigation of the charcoal assemblage may help in determining the role of wild food plants at East Rainton. The presence of flax at archaeological sites is often an indicator of textile production. The single flax seed from East Rainton cannot be associated with any such activities as it was too poorly-preserved to be identified as the cultivated variety (*Linum usitatissimum*), although it is possible that it represents a food or oil crop.

Charcoal

According to the Regional Research Framework for the North East (Petts and Gerrard 2006), there is a gap in the evidence on landscape and environment in this area of the country for the medieval period. The report highlights the need for detailed analysis of charcoal assemblages both to identify tree species and to look at the evidence for woodland management. A few charcoal assemblages arising from excavations carried out in Northumberland and Teesside have been analysed and reported on (*e.g.* Donaldson 1976; McCullagh 2000; Huntley 2005) and they can provide material for comparison, although the lack of charcoal data from the region is significant (Huntley 2010). East Rainton has yielded a large charcoal assemblage that might be of regional significance in addressing discussions relating to local vegetation and human exploitation of the local environment for fuel procurement.

The assessment of charcoal fragments from East Rainton has shown that a limited range of woody taxa were exploited for fuel. There was not generally a difference between the two phases and among feature types. The main sources of fuel wood derived from oak and hazel/alder. Regarding the latter, although in many cases it was not possible to differentiate between the two genera, the evidence suggests that both taxa were used for fuel and were sometimes represented in the same context. Woods from other trees, such as cherry/blackthorn, Maloideae and gorse/broom, were probably present as subsidiary fuels. These taxa indicate that a variety of vegetation environments were tapped into for fuel, oak indicates deciduous woodland, whilst hazel, cherry/blackthorn and Maloideae can grow in hedgerows, scrubs, mixed woodland or woodland margins. Alder occurred frequently and could have been sourced from damp woodland or wet/riparian environments, perhaps by the River Wear. The dominance of oak is not surprising as its wood makes an excellent fuel and can also be used for timber and joinery (Taylor 1981). It is likely that oak was widely available in the local woodland and that it's easy access might have been a decisive factor in the selection of this taxon. This woodland might have been managed using techniques to maintain supply. Evidence for the use of such techniques, for example coppicing, is available since the Neolithic and we know that by the early Medieval period most English countryside was under the control of local estates (Rackham 1990). Furthermore, some of the taxa present in this assemblage (*e.g.* oak and hazel) are known to make good coppices. Although tracing woodland management through charcoal analysis can be difficult, these samples hold the potential to inform us on if and how the local woodland was managed.

Some of the sampled contexts, for example the hearths, might represent *in situ* burning and have therefore the potential to inform us on fuel selection for specific purposes; others are secondary deposits that might have filled relatively quickly, such as the pit and the corn drying kiln backfills. Charcoal from the latter deposits might not represent a single episode, but rather an amalgam of waste coming from different sources. However, it still holds potential to give us a general picture of fuel acquisition strategies at the site. Finally, the ditch fills, being deposits that tend to be filled over a longer time span, are less useful in terms of providing information on fuel selection, but can better reflect original woodland composition and are well suited for environmental reconstructions. Although during assessment assemblages from different features did not show striking differences in the range of taxa, analysis involving identification of up to 100 fragments per context would provide more definite answers on the taxa present in the local vegetation and on the environmental niches exploited for fuel.

Recommendations

Charred Plant Macrofossils

It is recommended that a further 1L subsample from sample <87> is processed through flotation, following standardised methodologies described above. The subsample should be taken from a different bucket than the first subsample and, if possible, a different location within the deposit.

Full analysis of the charred plant macrofossils from East Rainton should be carried out in consideration of the following research questions:

- What was the nature of the arable economy at East Rainton and can a shift in the crop husbandry regime be detected between occupation Phases 2 and 4?
- How far do the arable weeds inform on cultivation methods at the site?
- Is there any evidence for risk management strategies at East Rainton?
- Did the occupants of the site exploit wild plant resources to diversify the cereal economy?
- How does the assemblage compare to other contemporary sites within the region and can a local archaeobotanical signature be detected for northern medieval corn-drying kilns?

In order to address these questions, it is recommended that full analysis of the charred plant macrofossils be carried out on samples containing >50 moderate to well-preserved individuals from East Rainton. Analysis should involve the sorting, identification and quantification of the charred plant macrofossils from each sample. Where plant remains are particularly abundant a representative subsample should be analysed. The subsequent report would discuss the results whilst addressing the research questions listed above and placing the assemblage into context through comparison with contemporary sites in the region. The charred plant macrofossils from the following samples are recommended for analysis:

Phase 2: <34> [184] and <98> [292].

Phase 4: <7> [117], <41> [128], <42> [132], <45> [205], <60> [191], <61> [192], <85> [198], <87> [177], <94> [234] and <113> [332].

Charcoal

Full analysis of the charcoal assemblage from East Rainton should be carried out with the aim of addressing the following research questions:

- What was the full range of taxa used and vegetation environments tapped into for fuel acquisition?
- What was driving fuel selection?
- What information can be gained on the local vegetation environment?
- Is there evidence for woodland management techniques?
- How does the assemblage compare to others contemporary charcoal assemblages from the same area?

It is recommended that analysis should involve the identification of 100 charcoal fragments from each sample, when available, and the preparation of a report suitable for publication addressing the research questions outlined above. Results of the analysis should be compared with published data that are available from the region. The following samples are recommended for charcoal analysis:

Phase 2: <34> [184], <98> [292].

Phase 4: <10> [123], <23> [144], <41> [128], <52> [217], <85> [198], <112> [341], <117> [337].

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RADIOCARBON DATING CERTIFICATE

13 November 2017

Laboratory Code	SUERC-75899 (GU45471)
Submitter	Kate Turner Pre-Construct Archaeology Ltd. Unit 54 Brockley Cross Business Centre 96 Endwell Road Brockley London SE4 2PD
Site Reference	Durham Road, East Rainton, Sunderland
Sample Reference	ERS16 <34> (1184)
Material	Charcoal : Quercus sp.
$\delta^{13}C$ relative to VPDB	-25.0 ‰
Radiocarbon Age BP	2285 ± 29

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

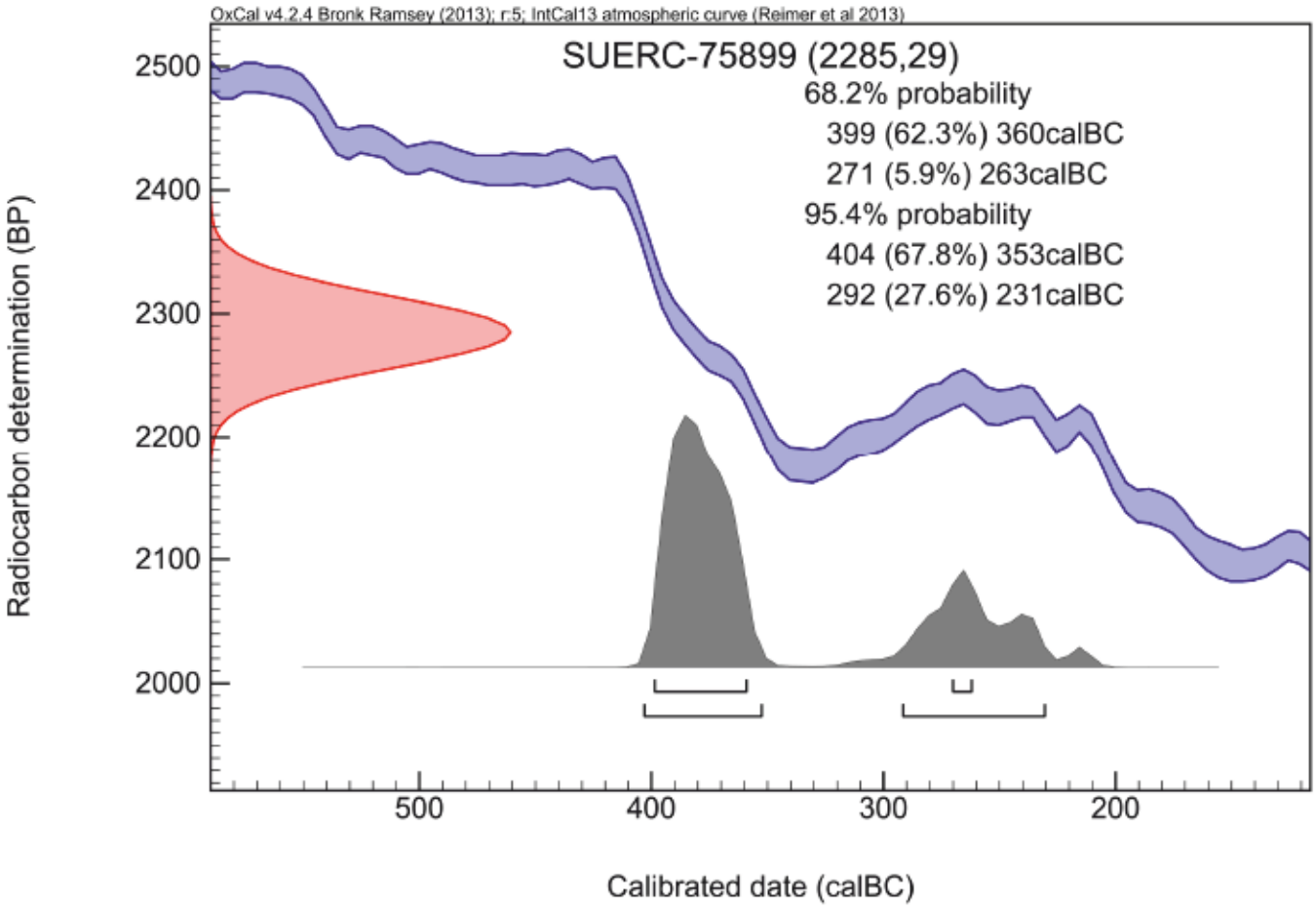
Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) *Radiocarbon 58(1) pp.9-23.*

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Naysmith



The radiocarbon age given overleaf is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.*

The above date ranges have been calibrated using the IntCal13 atmospheric calibration curve†

Please contact the laboratory if you wish to discuss this further.

* Bronk Ramsey (2009) *Radiocarbon 51(1) pp.337-60*
† Reimer et al. (2013) *Radiocarbon 55(4) pp.1869-87*

Scottish Universities Environmental Research Centre
Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride, Glasgow G75 0QF, Scotland, UK
Director: Professor F M Stuart Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE

13 November 2017

Laboratory Code	SUERC-75900 (GU45472)
Submitter	Kate Turner Pre-Construct Archaeology Ltd. Unit 54 Brockley Cross Business Centre 96 Endwell Road Brockley London SE4 2PD
Site Reference	Durham Road, East Rainton, Sunderland
Sample Reference	ERS16 <50> (213)
Material	Charcoal : cf. Prunus sp.
$\delta^{13}C$ relative to VPDB	-26.6 ‰
Radiocarbon Age BP	2272 ± 27

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

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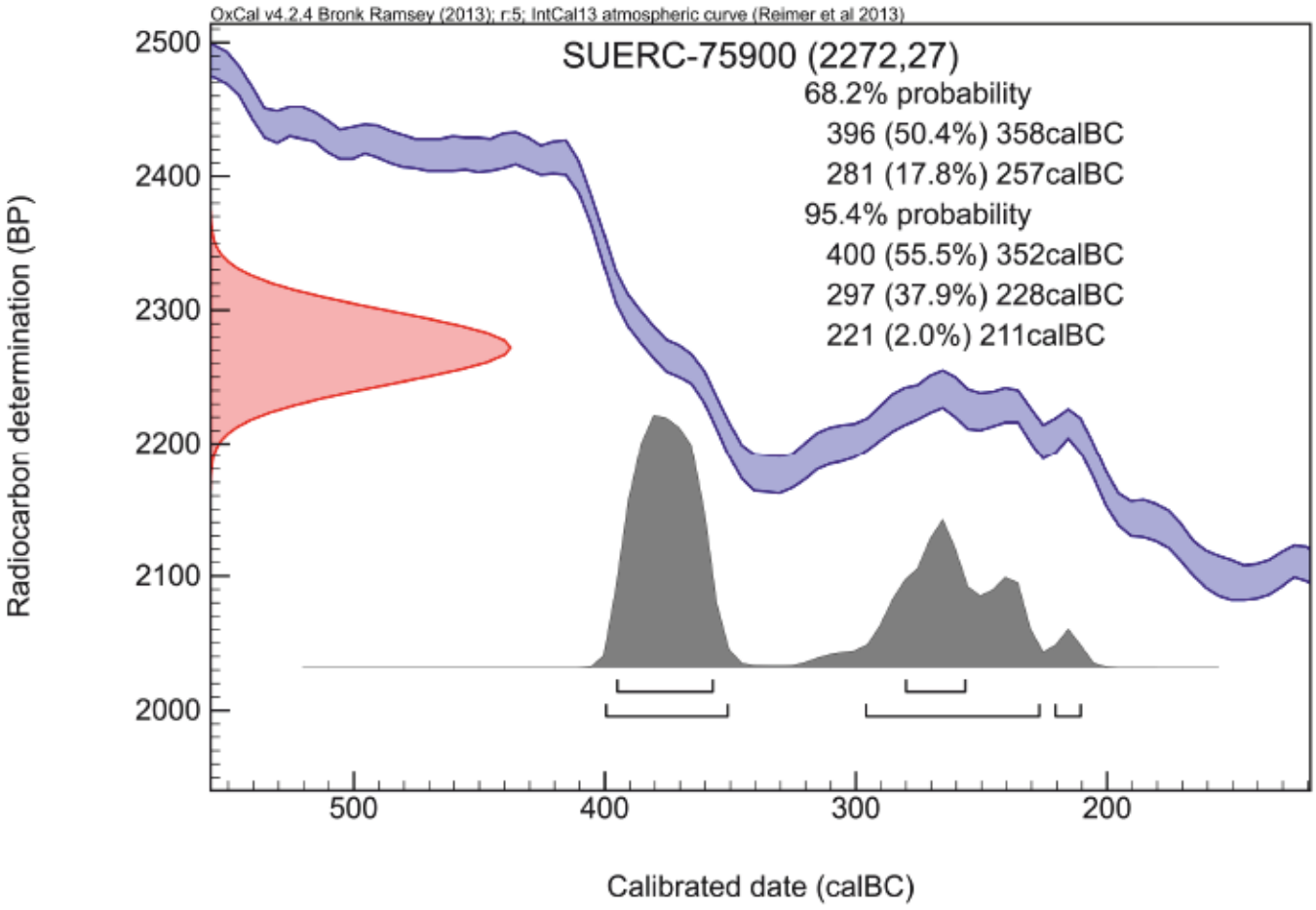
Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Naysmith



The radiocarbon age given overleaf is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.*

The above date ranges have been calibrated using the IntCal13 atmospheric calibration curve†

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† Reimer et al. (2013) *Radiocarbon 55(4) pp.1869-87*

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RADIOCARBON DATING CERTIFICATE

13 November 2017

Laboratory Code	SUERC-75904 (GU45473)
Submitter	Kate Turner Pre-Construct Archaeology Ltd. Unit 54 Brockley Cross Business Centre 96 Endwell Road Brockley London SE4 2PD
Site Reference	Durham Road, East Rainton, Sunderland
Sample Reference	ERS16 <98> (292)
Material	Charcoal : Leguminosae
$\delta^{13}C$ relative to VPDB	-24.9 ‰
Radiocarbon Age BP	1077 ± 29

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

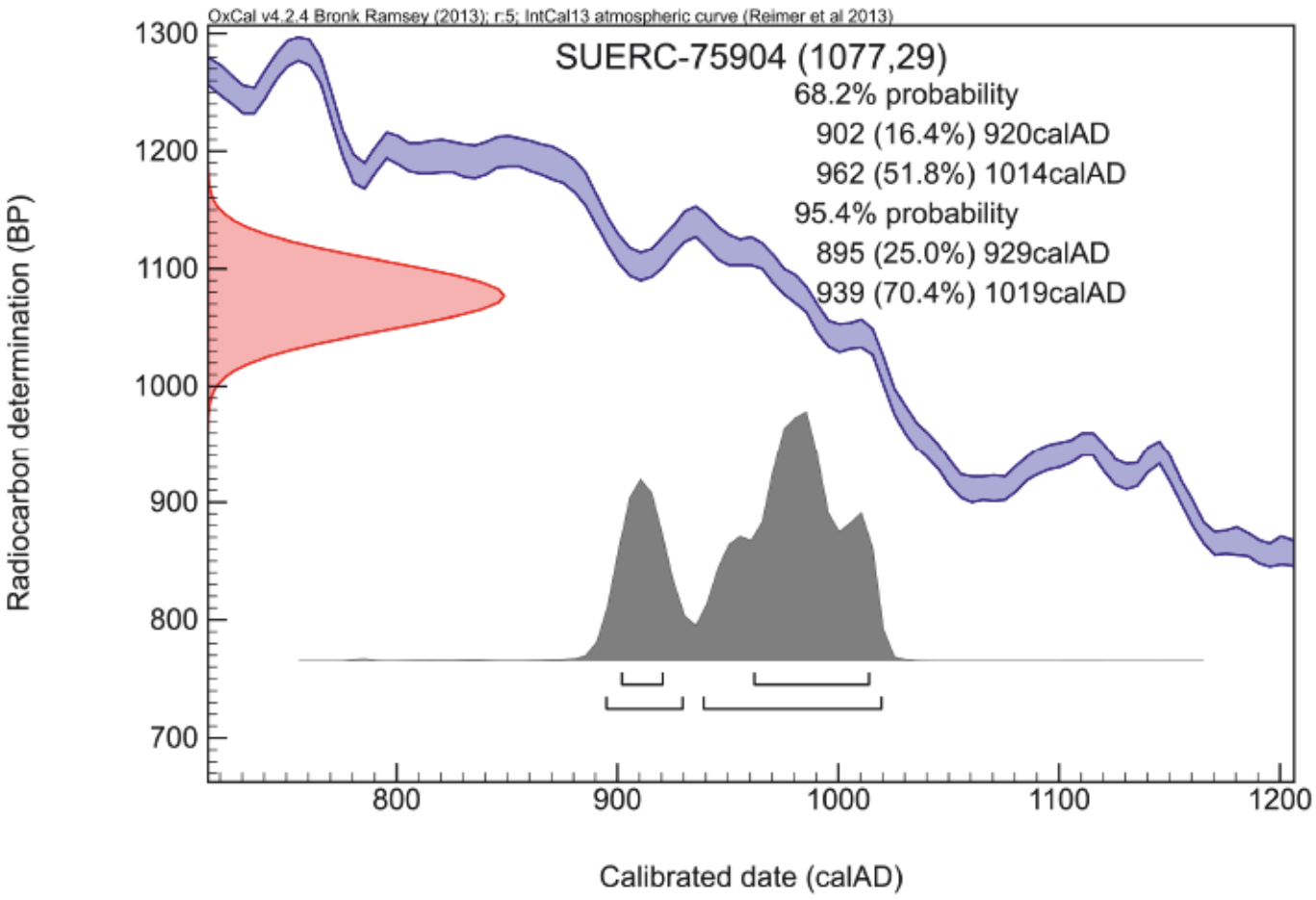
Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) *Radiocarbon 58(1) pp.9-23.*

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by : E. Dunbar

Checked and signed off by : P. Nayont



The radiocarbon age given overleaf is calibrated to the calendar timescale using the Oxford Radiocarbon Accelerator Unit calibration program OxCal 4.*

The above date ranges have been calibrated using the IntCal13 atmospheric calibration curve†

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RADIOCARBON DATING CERTIFICATE

13 November 2017

Laboratory Code	SUERC-75905 (GU45474)
Submitter	Kate Turner Pre-Construct Archaeology Ltd. Unit 54 Brockley Cross Business Centre 96 Endwell Road Brockley London SE4 2PD
Site Reference	Durham Road, East Rainton, Sunderland
Sample Reference	ERS16 <107> (311)
Material	Charcoal : cf. Corylus avellana
$\delta^{13}C$ relative to VPDB	-25.0 ‰ assumed
Radiocarbon Age BP	1170 ± 29

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

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Conventional age and calibration age ranges calculated by : E. Dunbar

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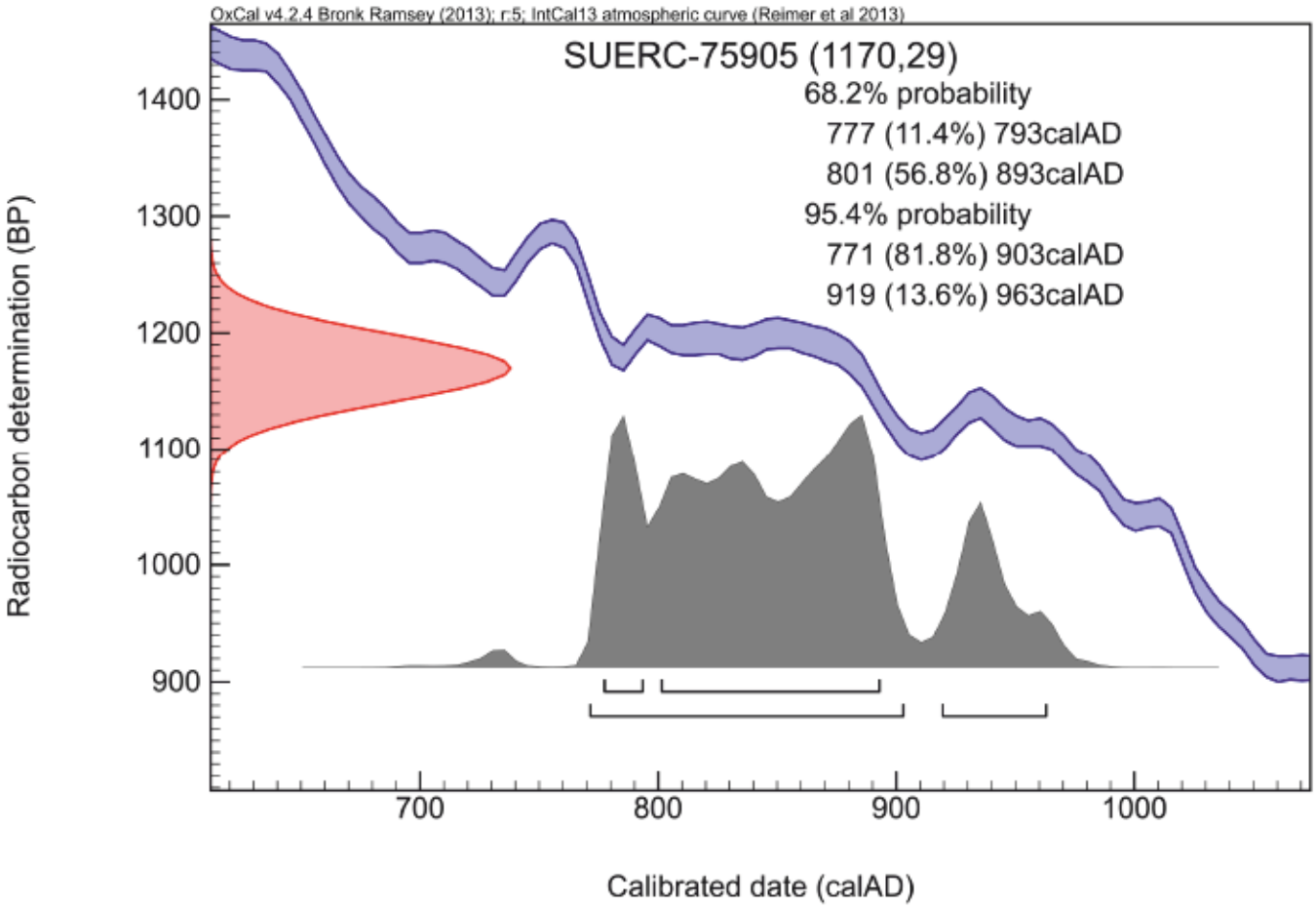

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† Reimer et al. (2013) *Radiocarbon 55(4) pp.1869-87*

APPENDIX 8: FAUNAL REMAINS ASSESSMENT

Karen Deighton

Introduction

A total of 206 animal bone fragments were hand collected from a range of contexts. Material attributed to the Iron age (Phase 2) was recovered from enclosure ditch [203] and segmented ditch [241], whilst bone from medieval contexts (Phase 4) came from pit [118], enclosure ditch [229] and corn drying kilns [129], [158] and [315]. Material from seven environmental sample residues (mesh size= 2mm, 10mm) is also included.

Method

The material was firstly sorted into recordable and non-recordable fragments and bones with fresh breaks were reassembled. Identification was aided by Schmid (1972). The following were recorded for each element: context, anatomical element, taxa, proximal fusion, distal fusion, side, burning, butchery, pathology and erosion. Ribs and Vertebra were recorded as horse, pig, dog, sheep size or cattle size but not included in quantification as their multiple numbers introduce bias. Recognition and recording of butchery is after Binford (1981). The material was recorded onto an access database.

Preservation

Fragmentation was heavy with most elements at the fragment stage, indeed only teeth survived complete. The heavy fragmentation greatly reduced the number of bones identifiable (only 36) as many fragments appeared to belong to single bones. Bone surface condition was fairly poor which could have obscured evidence for butchery and canid gnawing as only one example of chopping was seen.

Context	Cut	Cattle	Horse	Total
207	ditch 202	7		7
240	ditch 241		5	5
Total		**7**	**5**	**12**

Table 1: No. of fragments Phase 2 Iron Age

Context	Cut	Cattle	Cattle size	Horse	Sheep/goat	Sheep size	Pig	Total
117	pit 118	4	1		2		1	8
126	corn dryer 129	2						2
191	corn dryer 158	1*						1
231	ditch 229	3	1	1			1	6
332	corn dryer 315			1+				1
333	corn dryer 315			3#		1		4
334	corn dryer 315		1	1				2
Total		**10**	**3**	**6**	**2**	**1**	**2**	**24**

Table 2: No. of fragments Phase 4 Medieval

* 17 fragments of a single cattle mandible, # includes maxilla consisting of 16 fragments, +15 fragments of maxilla
context [234] produced unidentified fragments only.

Context	Cut	Sample	Phase	Cattle	Pig	Indeterminate
117	pit 118	7	4	1		20
131	corn dryer 129	40	4	1		
198	corn dryer 141	85	4			2
234	ditch 229	94	4	1*		
311	ditch 312	107	2		1	4
333	corn dryer 315	114	4			2
341	hearth 342	112	4			1

Table 3: No. of fragments from sample residues
* Multiple fragments of one bone

Potential and significance

The potential of the assemblage for further analysis is severely limited by the paucity of and heavy fragmentation of the material. Again its significance in contributing to the understanding of the site is reduced to providing a glimpse of the taxa associated with the site. It should be noted that the high portion of horse remains is interesting, although this could be an artefact of the small size of the assemblage. Material from the samples adds little to the hand collected assemblage beyond slightly augmenting the amount of cattle and pig bone.

Recommendations

No further work is recommended.

References

Binford, L. 1981 Bones ancient man and modern myths. New York: Academy Press

Schmid, E 1972 Atlas of animal bones London: Elsevier press

APPENDIX 9: METAL PRODUCTION RESIDUES ASSESSMENT

Dr R. Mackenzie

Introduction

The following report covers the initial assessment of potential metallurgical production residues recovered during archaeological fieldwork on land at East Rainton, Tyne & Wear.

The aims of this assessment have been to provisionally identify and quantify the slag-like residues and determine whether further analysis could provide additional information about the sites, or activities previously carried out there.

Some metal production processes produce slag by-products that are characteristic of that process; however, many production processes also produce significant amounts of undiagnostic slag that cannot be attributed to anything more than a very broad category without detailed metallurgical analysis.

The production of metals is not the only source of archaeological slag, and other pyrotechnic processes known to produce slag include glass and pottery making. It can also be produced by fires associated with cremations or the burning down of buildings (Keys 2012, 2; Salter 2005, 1-2).

In some cases, scientific analysis can help to determine the process origin of slags, although this is normally only justified where there is supporting archaeological or historical evidence, or the particular slag found is of an archaeometallurgically significant type.

Methodology

All of the macro fragments in the assemblage have been visually examined and, where necessary, tested for magnetic response. The sieved material from the bulk environmental sample (117) was spread over a large tray and the sample was checked visually and magnetically for metallurgical residues.

Results of assessment

A full breakdown of the assemblage by context and material type is provided in Table 1 below.

Initial interpretation of results

Apart from two fragments of weathered undiagnostic slag that were recovered from a context dated to the Iron Age, all of the fragments of slag in the assemblage were recovered from contexts that date from the medieval period.

There is a relatively small amount of slag that could relate to the forging (blacksmithing) of iron, and this material was found in the fills of pit [118] and ditch [120]. The amount of slag found at this stage suggests that blacksmithing activities at the site were either short lived, or only carried out on an occasional basis.

The presence of what appears to be either a piece of partially burnt coal or coke fuel found in the fill of hearth [121] is interesting because, if it is a piece of deliberately manufactured coke fuel, its potential medieval date would make it a very early example of the use of this fuel in Britain. There is a chance that the piece may have become unintentionally turned into coke in a partially burnt coal fire, and the archaeological context of the fragment suggests that this may be a possibility. Coke was and is commonly used as a metallurgical fuel, although it can be used as a clean burning (but expensive) alternative to coal for domestic use.

A fragment of slagged clay hearth lining and undiagnostic slag was recovered from the backfill [191] of one of the corn drying kilns, and the morphology of the slag bears some similarities with coal derived fuel ash slag; it is tentatively suggested that coal (or possibly coke?) may have been used as fuel in the corn drying kiln.

Potential of the assemblage

The general feel of the slag assemblage is that it may not represent the full picture of iron production activities at the site. At present, the metallurgical slag recovered from this site does not offer potential for further analysis, but it is recommended that the larger fragments of potential iron smithing slag from context [119] are retained as part of the site archive to give the option for metallurgical analysis in the future.

Recommendations

It is recommended that the potential metallurgical slag from the assemblage is retained to give the opportunity for further analysis in the future.

Bibliography

Keys, L. 2012. Specialist Report 6: Slag and High Temperature debris. In E. Biddulph, E. Stafford, S.Foreman, D.Stansbie, R.A. Nicholson (eds).*London Gateway: Iron Age and Roman Salt Making in the Thames Estuary, Excavation at Stanford Wharf Nature Reserve, Essex*. Oxford Archaeology Monograph Volume 18.

Salter, C. 2005. Specialist Report; The Slag-Like Material. In G.Lock; C.Gosden; P.Daly (eds) *Segsbury Camp: excavations in 1996 and 1997 at an Iron Age hillfort on the Oxfordshire Ridgeway*. Oxford University School of Archaeology Monographs, Issue 61.

Context No.and cut	Sample No.	Phase	Undiagnostic slag	Iron Smelting Residues	Iron Smithing Residues	Fluel Ash Slag	Fired Clay	Other	Interpretation
			No/Wt(g)	No/Wt(g)	No/Wt(g)	No/Wt(g)	No/Wt(g)	No/Wt(g)	
117 pit 118	7	4			2 / <1				Small fragments of possible iron smithing slag.
117 pit 118	7	4			1 / <1				Small piece of spheroidal hammerslag, circa 2.5mm diameter.
117 pit 118	7	4							Bulk environmental type sieved sample of approximately 250ml volume; consists of granules of fine gravel less than 3mm in size. No evidence of metal production or other 'industrial' residues is apparent in the sample.
119 ditch 120		4	2 / 391						Relatively large fragments of slag that probably relate to iron production, but are undignostic of a specific production process.
123 hearth 121	10	4						1 / 1	Fragment of coke fuel or partially burnt coal.
144 hearth 143	23	4						1 / 2	Fragment of limestone(?)
144 hearth 143	23	4						1 / <1	Small fragment of roasted ironstone with flat V-shaped, approximately 10mm x 8mm x 2.5mm.
191 corn dryer 158	60	4							Small fragment of slag that probably relates to iron production, but is undignostic of a specific production process.
191 corn dryer 158		4	1 / 1				1 / 13		Fragment of slagged clay; probable lining from kiln hearth.
207 ditch 202		2	2 / 27						Possible metallurgical slag, but undiagnostic of specific process.
341 hearth 342	112	4						3 / 1	Small fragments of corroded ferrous metal wire/thin bar; possible fragments of iron nails.
333 corn dryer 315	114	4	2 / 11						Possible metallurgical slag, but undiagnostic of specific process.

Table 1: Assemblage by context and material type.

APPENDIX 10: SMALL FINDS ASSESSMENT

John Nolan (NCAS)

Fe Knife SF2, fill [117] of Phase 4 pit [118]

Four lumps of dried soil with thin, decomposing, Fe, fragments showing recent (lifting) breakage, were submitted for examination. One fragment appears in profile to form a 'point'. Fragments appear to show a section tapering from *c.* 3mm to a finer 'edge'. The largest concretion seems to contain two overlying 'layers' of decomposed iron.

Because of its condition this object cannot be firmly identified, though it may be the remains of a knife. However the apparent 'layering' seen in one concretion is suggestive of the crossing blades of a pair of shears.

Given the condition of the metal, it is unlikely that cleaning and conservation would allow reconstruction or more positive identification.

APPENDIX 11

QUERNSTONE ASSESSMENT

David Heslop

Description

Recovered unstratified from beyond northern limit of excavation area during construction work.

Large, flat, substantially complete quern, with marked hopper groove. Diam. 43.5 cm; max height 8.7 cm. Weight 19.7kg. The form is basically disk-shaped, with curving, but rather irregular sides. Two large areas of damage on opposite sides of the upper surface, possible in the position(s) of vertical handle sockets. There are no other indications of handle fixings. The hopper is broad and conical, a little asymmetrically aligned to the very wide feed-pipe. Hopper, 8.6 cm wide and feedpipe, 6.0 cm wide. The groove has an external diameter of 16.1 cm and is 22 mm wide and 4 mm deep. The outer surface, hopper and groove are fashioned in very regular pecked tooling, form a masonry point 6 mm long and 4 mm wide. Recently re-dressed grinding face, pecked with similar tool to form the upper surface. The centre of the stone, around the eye, shows wearing of the pecked dressing.

Lithology

Light orange-brown fine-grained probably local sandstone, possibly a Coal Measures sandstone. Slightly micaceous, with sparse circular ferruginous voids, up to 12 mm across. No larger inclusions or fossil pits.

Discussion

The combination of form, features and decoration of the quern are unusual. Across northern England and southern Scotland, the only other example, a quern (YQS 5635) from a Hull Unit excavation of a Romano-British site at Caythorpe, East Yorkshire, which is 420 mm diameter overall, has a 8 mm wide, but quite shallow, groove at 140 mm diameter, but no hopper - it has a similar “bun-shaped” profile and it also has no harp grooves on the grinding face, unlike many Romano-British querns. Without any fixing points for an external hopper, a decorative explanation for the groove seems more plausible. In the absence of evidence for handle holes, the possibility remains that the upper surface damage conceals shallow sockets for vertical handles. If this was the case, a medieval date is more likely.

In conclusion, the quern is could be either Romano-British or medieval in date, but is of a type which has no direct parallels among nearly 7,500 recorded from Central Britain. YQS number (7365).

Tyne and Wear Archaeology Service

Specification for a Strip, Map and Record Excavation at land to rear of Markle Grove, East Rainton, Sunderland

Planning Application: 14/00506/OUT and 16/00062/P7

Author:

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Date: 23rd May 2016

County Archaeologist's Reference Number: MON14064

The Tyne and Wear Archaeology Service is the curatorial service for archaeology and industrial archaeology throughout the Tyne and Wear districts. It helps and advises Newcastle, Gateshead, North Tyneside, South Tyneside and Sunderland Councils to carry out their statutory duties to care for the precious historic environment of Tyneside and Wearside. The Service can be found at the Development Management division of the Investment & Development Directorate of

Newcastle City Council

Introduction

Site grid reference: NZ 3371 4818

Outline planning permission has been granted for a residential development on the above site, subject to archaeological conditions.

An archaeological desk based assessment has been produced (AD Archaeology, October 2013). This report concluded that the site lies immediately east of the medieval village of East Rainton. During the medieval period the site would have been used for agriculture and possibly craft industries. During the post medieval period, Dunwell Pit was sunk to the south-east. A railway spur to the pit ran adjacent to the east side of the development site.

A geophysical survey has been produced (AD Archaeology, January 2016). The survey identified several possible elements associated with the medieval village, including a possible boundary ditch, ridge and furrow, a post medieval boundary, and a possible area of burning, kiln or furnace.

Ten evaluation trenches were excavated (AD Archaeology, March 2016). Features of archaeological significance were identified in the south western portion of Field 1 corresponding with anomalies identified during the earlier geophysical survey. The archaeological features consist of a ditch along the south western edge of the field in trenches 8, and 9 (with a second running alongside in trench 9) which is likely to represent a medieval village boundary ditch, and three large features in trenches 7 and 10 that probably represent kilns also of likely medieval origin.

A further programme of archaeological work involving a Strip and Record (with the full excavation of industrial features) is required in the south-western portion of Field 1 of the site prior to development.

The kilns (710, 718, 1003) appeared similar in plan (feature 710 was only partially exposed) consisting of large pear-shaped cuts probably representing the combustion chamber and narrower draw-hole or flue. Kilns 718 and 1003 had evidently been exposed to extreme heat, kiln 718 contained in situ fired clay lining and a reddened stone visible on the edge of the draw-hole. Stones within the natural subsoil at the base of kiln 1003 were also reddened. There was no conclusive evidence from the excavated segments as to their function, and although three fragments of metallic slag were recovered from the infill of kiln 710 these fragments are not associated with primary deposits from the feature or its demolition and may have derived from activity elsewhere at the village. Overall the kilns have more parallels with excavated examples of lime kilns (English Heritage, 2011, Introductions to Heritage Assets: Pre-industrial Lime Kilns) or perhaps to lesser extent corn drying kilns rather than ironworks which tend to be smaller in size and different in form (English Heritage 2011b). A function as pottery kilns is unlikely due to the absence of any pottery sherds from any of the features or in the overlying ploughsoil.

The appointed archaeologist **must** familiarise themselves with the results of previous archaeological work on the site before starting work. They **must** also read English Heritage, 2011, Introductions to Heritage Assets: Pre-industrial Lime Kilns.

In accordance with paragraph 141 of the National Planning Policy Framework and UDP Policies B11, B13 and B14 a strip, map and record excavation is now required. The area to be subject to archaeological work is shown on the attached plan.

Research Aims and Objectives

The excavation report should make reference to Regional and Thematic Research Frameworks.

'Shared Visions: The North-East Regional Research Framework for the Historic Environment' by David Petts with Christopher Gerrard, 2006 notes the importance of research as a vital element of development-led archaeological work. It sets out key research priorities for all periods of the past allowing commercial contractors to demonstrate how their fieldwork relates to wider regional and national priorities for the study of archaeology and the historic environment. The aim of NERRF is to ensure that all fieldwork is carried out in a secure research context and that commercial contractors ensure that their investigations ask the right questions.

'Frontiers of Knowledge' edited by Matthew FA Symonds and David JP Mason 2010 is the Research Framework for Hadrian's Wall, part of the Frontiers of the Roman Empire World Heritage Site. The aim of the publication is to assess the existing knowledge base for our understanding of the monument, to identify and prioritise key themes for future research and to set out a strategy and action plan by which the initial set of objectives might be achieved.

'Mesolithic Research and Conservation Framework 2013' by Edward Blinkhorn and Nicky Milner aims to improve the understanding of the Mesolithic of England and set out key issues and priorities for future work.

For the English Heritage Research Agenda see
https://historicengland.org.uk/images-books/publications/eh-research-agenda/

Where appropriate note any similar nationwide projects using ADS, internet search engines, ALSF website, HEEP website, OASIS, NMR excavation index.

All staff on site must understand the project aims and methodologies.

Methods statement for strip and record

Once the site is carefully machine-stripped of topsoil (under constant archaeological supervision), the location of visible archaeological features will be recorded by plan using a total station.

Preliminary hand-cleaning will indicate the selected areas suitable for full excavation or partial, selective excavation, further informed by discussions with the County Archaeologist and Dr. Jacqui Huntley, Scientific Advisor for Historic England.

This will be followed by a programme of selected or targeted excavation. A programme of palaeo-environmental sampling will also be undertaken, with a view to undertaking targeted analysis of the samples.

The work will excavate, record and environmentally sample the archaeological deposits of importance found on the plot.

A principal aim of the excavation is to ascertain the type and function of the kilns and the methods of construction. Finds might include lime and partly fired limestone blocks, bones, pottery, tile, shell, slag, burnt clay, glass fragments and iron objects. Charcoal is occasionally found preserved in the hearth area and impressions of wood used in the firing may survive in the clay or lime. Archaeomagnetic techniques could be used to date the clay lining of some kilns.

For medieval lime kilns, historical sources can be of use for dating purposes. Although lime kilns were not taxable structures and their existence is not recorded in general surveys, they are sometimes mentioned in building contracts and accounts relating to an associated building such as a castle, which may state the amounts of raw materials used in construction or the amounts of fuel consumed {English Heritage, 2011}.

The aim of the excavation is to ascertain the nature, character, function, degree of survival, date and duration, date of final abandonment of the archaeological features.

The significance of the site in relationship/comparison to nearby sites of similar date should be examined, and the results of the fieldwork within the wider research context.

All staff employed by the Archaeological Contractor shall be professional field archaeologists with appropriate skills and experience to undertake work to the highest professional standards.

The work will be undertaken according to English Heritage Guidelines - Managing Archaeological Projects 2nd Edition ('MAP2') 1991 (www.english-h.gov.uk/guidance/map2/index.htm) and Management of Research Projects in the Historic Environment (MoRPHE) – The MoRPHE Project Managers' Guide, Project Planning Notes and Technical Guides 2006 (www.english-heritage.org.uk/publications).

The work will be undertaken according to MoRPHE Project Planning Notes 2006 - PPN3 – Archaeological Excavation and PPN6 – Development of Procedural standards and guidelines for the historic environment.

All work must be carried out in compliance with the codes of practice of the Institute of Field Archaeologists and must follow the IFA Standard and Guidance for Archaeological Excavation. www.archaeologists.net

Notification

The County Archaeologist needs to know when archaeological fieldwork is taking place in Tyne and Wear so that he can inform the local planning authority and can visit the site to monitor the work in progress. The Archaeological Contractor must therefore inform the County Archaeologist of the start and end dates of the Excavation. He must also keep the County

Archaeologist informed as to progress on the site. The CA must be informed of the degree of archaeological survival and of any significant finds. The Client will give the County Archaeologist reasonable access to the development to undertake monitoring.

PROJECT INITIATION

PROJECT DESIGN

Because this is a detailed specification, the County Archaeologist does **not** require a Project Design from the appointed archaeologist. The appointed archaeologist is expected comply with the requirements of this specification.

HEALTH AND SAFETY AND RISK ASSESSMENT

A health and safety statement and risk assessment, identifying potential risks in a risk log (see template in appendix 2 of The MoRPHE Project Manager's Guide) and specifying suitable countermeasures and contingencies, is required to be submitted to the commissioning client.

The Client may wish to see copies of the Archaeological Contractor's Health and Safety Policies.

The Archaeological Contractor must maintain a Site Diary for the benefit of the Client, detailing the nature of work undertaken on a day by day basis, with full details of Site Staff present, duration of time on site, etc. and contact with third parties.

The Management of Research Projects in the Historic Environment (MoRPHE) – The MoRPHE Project Managers' Guide 2006 contains general guidance on Risk management (section 2.3.2, Appendix 2).

Risk assessments must be produced in line with legislative requirements (for example the Health and Safety at Work Act 1974, the Management of Health and Safety at Work Regulations 1999, the Control of Substances Hazardous to Health (COSHH) Regulations 2002 and the Personal Protective Equipment at Work Regulations 2002) and best practice e.g. as set out in the FAME (Federation of Archaeological Managers & Employers) formerly SCAUM (Standing Conference on Archaeological Unit Managers) Health and Safety Manual www.famearchaeology.co.uk

The Risk Assessment will identify what PPE (hard hats, glasses/goggles, steel toe cap and instep boots, gloves, high-viz clothing etc) is required.

Other potentially applicable legislation:

Working at Heights Regulations 2005, Manual Handling 1992

'Safe use of ladders and stepladders: An employers' guide' HSE Books 2005

Some archaeological work (such as those that are scheduled to last more than 30 days and have more than 20 workers working simultaneously at any point in the

project, or exceed 500 person days) may be deemed notifiable projects under Construction Design and Management Regulations 2015.
Where C.D.M Regs apply, the HSE must be notified before work begins.
http://www.legislation.gov.uk/uksi/2015/51/contents/made

Detailed information on hazards and how to carry out a risk assessment can be obtained from the Health and Safety Executive (www.hse.gov.uk) and the local authority health and safety department.

Specific guidance for land contamination and archaeology can be obtained from the Institute for Archaeologists (www.archaeologists.net), the Construction Industry Research and Information Association (www.contaminated-land.org) and the Association of Geotechnical and Geoenvironmental Specialists (www.ags.org.uk).

See also Environment Agency, 2005 "Guidance on Assessing the Risk Posed by Land Contamination and its Remediation on Archaeological Resource Management".

The Archaeological Contractor must be able to provide written proof that the necessary levels of Insurance Cover are in place.

The Archaeological Contractor must detail measures taken to ensure the safe conduct of excavations, and must consult with the client's structural engineers concerning working in close proximity to the foundations of the surrounding buildings.

Excavation trenches should:

- Be protected from vehicles and guarded off for pedestrians
- not have steep sides or must be shored
- have good access and egress

The archaeologists must not work near overhead power lines.

Underground services can be easily damaged during excavation work. If proper precautions are not taken, it is all too easy for workers to hit these services resulting in a risk of

- heat, flame and molten metal from electric cables
- escaping gas from gas pipes
- flooding of the excavation when a water pipe is damaged
- interruption of services

Excavation work in the public highway, kerbside or pavement can only be undertaken by those with a Street Works certificate of competence. Before the excavation takes place the person supervising the digging must have been given service plans and be trained in how to read them. All persons involved in the excavation must know about safe digging practice and emergency procedures. A locator must be used to trace the line of any pipe or cable or to confirm that there are no pipes or cables in the way. The ground will be marked accordingly. There must be an emergency plan to deal with damage to cables and pipes.

PROJECT EXECUTION

Strip and record

The area of strip and record is shown on the accompanying plan.

1 Topspoil stripping

An onsite meeting will take place **before** topsoil stripping takes place between the on-site contractor and the appointed archaeological contractor. The purpose of this meeting is to agree a methodology for topsoil stripping and to ensure that everyone understands the methodology and timetable for topsoil stripping. At this meeting the type of truck to be used for removing the topsoil from site will be agreed (large vehicles are likely to cause rut-damage to the site so should not be used). An access route for the trucks will also be agreed to ensure that the vehicles are not driven over the exposed excavation area.

The appointed archaeological contractor will advise the on-site contractor of the type and size of machine which will be suitable for topsoil stripping operations. The on-site contractor will supply this machine and a machine operator. A toothless ditching bucket **must** be used.

The archaeological contractor must be permanently present throughout topsoil stripping operations to guide the machine operator and to ensure that the archaeological remains are not damaged during this process.

Topsoil stripping can if necessary be carried out in phases. This will ensure that the location of archaeological features can be recorded by plan with a total station before the area dries out, when ephemeral features will become more difficult to identify.

2 Preliminary hand cleaning and planning

Preliminary hand-cleaning will indicate areas suitable for full excavation or partial, selective excavation.

Work from the known archaeological features to the unknown.

All parts of the excavation area will be examined with a view to ascertaining the chronological sequential phasing of the site and recovering structural details.

The excavation area must be accurately surveyed prior to excavation and tied in to the national grid.

The location and extent of archaeological features will be accurately recorded by scale plan using a total station.

Targeted areas will then be selected for excavation in consultation with the County Archaeologist and Dr. Jacqui Huntley, Scientific Advisor for Historic England.

3 Archaeological excavation

A programme of selected or targeted excavation will be undertaken as agreed with the County Archaeology Officer and Dr.Jacqui Huntley, along with a programme of palaeo-environmental sampling and scientific dating, with a view to undertaking targeted analysis of the samples.

All kilns or other industrial features will be 100% excavated.

All short ditches/gullies and other short linear features will be subject to excavation of 40% of their total length, to include any ditch terminals.

Major linear ditches will require a number of sections to be dug across them (discuss with County Archaeology Officer).

Terminals of ditches or other features must be fully excavated and recorded.

All stratigraphical relationships (i.e. inter-cutting features) have the potential to produce stratigraphic sequences and must be fully excavated and recorded.

All pits and postholes must be excavated and recorded, but those over 0.5m only need to be half-sectioned.

The excavation must avoid known services.

The archaeologists must stay a safe distance away from any pylons and overhead power lines.

The commissioning client will advise of any ecological or biodiversity issues which need to be taken into consideration.

The commissioning client will advise of any protected trees which must be avoided by the excavation. Damage to trees covered by a Tree Protection Order carries a substantial fine.

The excavation area position should be accurately surveyed prior to excavation and tied in to the national grid.

The excavation area should be excavated to the depth of natural subsoil.

The excavation must avoid any **Japanese Knotweed** (it is the commissioning client's responsibility to advise their archaeologist if Japanese Knotweed is present on the site). Japanese knotweed was introduced into Britain in the 19th century as an ornamental plant. Over time it has become widespread in a range of habitats, including roadsides, riverbanks and derelict buildings. It out-competes native plants and animals and is now classed as an invasive species. It spreads through its crown, rhizome (underground stem) and stem segments, rather than its seeds. The weed can grow a metre in a month and can grow through concrete and tarmac, damaging buildings and roads. Studies have shown that a 1cm section of rhizome can produce a new plant in 10 days. Rhizome segments can remain dormant in soil for twenty years before producing new plants.

In the UK there are two main pieces of legislation that cover Japanese Knotweed. These are:

Wildlife and Countryside Act 1981
Listed under Schedule 9, Section 14 of the Act, it is an offence to plant or otherwise cause the species to grow in the wild. This lists over 30 plants including Japanese knotweed, giant hogweed and parrot's feather. An offence under the Wildlife and Countryside Act can result in a criminal prosecution.

Environmental Protection Act 1990
Japanese Knotweed is classed as 'controlled waste' and as such must be disposed of safely at a licensed landfill site according to the Environmental Protection Act (Duty of Care) Regulations 1991. Soil containing rhizome material can be regarded as contaminated and, if taken off a site, must be disposed of at a suitably licensed landfill site and buried to a depth of at least 5 m. An infringement under the Environmental Protection Act can result in enforcement action being taken by the Environment Agency which can result in an unlimited fine. You can also be held liable for costs incurred from the spread of Knotweed into adjacent properties and for the disposal of infested soil off site during development which later leads to the spread of Knotweed onto another site.

See also the Environment Agency 'Japanese Knotweed Code of Practice'.

It's down to landowners to control these plants, but they don't have to remove them. However, causing the plants to spread by removing or disposing of them incorrectly [i.e. disturbing them through archaeological excavation] would be illegal {info taken from www.environment-agency.gov.uk and www.devon.gov.uk}.

Tasks

Hand excavation, recording and environmental sampling (as stipulated below) of deposits down to the depth specified above.

Excavation is to be carried out by single context planning and recorded on *pro forma* context sheets.

Environmental sampling (and where relevant scientific dating) are compulsory parts of the excavation exercise. All tenders will give a price for the assessment, full analysis, report production and publication per environmental and scientific dating sample as a contingency.

The kilns or finds from them will need to be subject to scientific dating.

Samples will be taken of bricks from any brick-built structures. The dimensions of the bricks and the type of bonding must be recorded.

Scientific investigations should be undertaken in a manner consistent with "The Management of Archaeological Projects", English Heritage 1991 and with "Archaeological Science at PPG16 Interventions: Best Practice for Curators and Commissioning Archaeologists", English Heritage, 2003. Advice on the sampling strategy for environmental samples and samples for scientific dating etc. must be sought from Jacqui Huntley, English Heritage Regional Advisor for Archaeological

Science (jacqui.huntley@english-heritage.org.uk or 07713 400387) **before** the evaluation begins. See Appendix 1 for more information.

See Appendix 2 for guidance on procedures relating to human remains.

See Appendix 4 for guidance on Treasure Act procedures.

Recording

A full written, drawn (accurate scale plans, elevations and section drawings) and photographic record (of all contexts in **either** black and white print and colour transparency **or** with a digital camera) will be made. All images must include a clearly visible graduated metric scale.

All photographs forming part of the record should be in sharp focus, with an appropriate depth of field. They should be adequately exposed in good natural light or, where necessary, sufficiently well-lit by artificial means.

Use of digital cameras

Use a camera of 10 megapixels or more.

For maximum flexibility digital Single Lens Reflex cameras offer the best solution for power users. 10 megapixels should be considered a minimum requirement.

When photographing with digital SLR cameras, there is often a magnifying effect due to smaller sensor sizes.

If the JPEG (Joint Photographic Experts Group) setting is used, set the camera for the largest image size with least compression. The JPEG format discards information in order to reduce file size. If the image is later manipulated, the quality will degrade each time you save the file.

For maximum quality, **the preferred option** is that the RAW (camera-specific) setting is used. This allows all the information that the camera is capable of producing to be saved. Because all of the camera data is preserved, post processing can include colour temperature, contrast and exposure compensation adjustments at the time of conversion to TIFF (Tagged Interchangeable File Format), thereby retaining maximum photographic quality.

The RAW images must be converted to TIFF before they are deposited with the HER and TWAS because special software from the camera manufacturer is needed to open RAW files.

Uncompressed formats such as TIFF are preferred by most archives that accept digital data.

Post photography processing:

The submitted digital images must be 'finished', ready to be archived.

Post photography processing workflow for RAW images:

1 Download images
2 Edit out unwanted shots & rotate
3 Batch re-number
4 Batch caption

5 Batch convert to TIFF
6 Edit in Photoshop or similar
7 Save ready to burn to CD
8 Burn to CD
9 Dispatch

Batch caption – the image files should be named to reflect their content, preferably incorporating the site or building name. Consistent file naming strategies should be used. It is good practice not to use spaces, commas or full stops. For advice, go to http://ads.ahds.ac.uk/project/userinfo/deposit.html#filenaming . In order to find images at a future date and for copyright the site or building name, photographer's name and/or archaeological unit etc must be embedded in the picture file. The date can be appended from the EXIF data. Metadata recording this information must be supplied with the image files. A list of images, their content and their file names should be supplied with the image files on the CDs.

Batch conversion to TIFF – any white balance adjustments such as 'daylight' or 'shade' be required then this can be done as part of the conversion process. Ensure that any sharpening settings are set to zero.

Edit in 'Imaging' software such as Photoshop – tonal adjustments (colour, contrast) can be made. Rotate images where necessary, crop them to take out borders, clean the images to remove post-capture irregularities and dust. Check for sensor dust at 100% across the whole image.

Save ready for deposit – convert to TIFF and save. Retain the best colour information possible – at least 24 bit.

If the JPEG setting has been used and the image has been manipulated in any way it should be saved as a TIFF to prevent further image degradation through JPEGing.

Burn to CD – the NMR recommends using Gold CDs. Use an archive quality disk such as MaM-E gold. Gold disks have a lower burn speed than consumer disks.

Disks should be written to the 'Single Session ISO9660 – Joliet Extensions' standard and not UDF/Direct CD. This ensures maximum compatibility with current and future systems.

Images should be placed in the root directory not in a folder.

The CD will be placed in a plastic case which is labelled with the site name, year and name of archaeological contractor.

For more guidance on digital photography:

Digital Imaging Guidelines by Ian Leonard, Digital Archive Officer, English Heritage 22 September 2005)

Understanding Historic Buildings – A guide to good recording practice, English Heritage, 2006

Duncan H. Brown, 2007, "Archaeological Archives – A guide to best practice in creation, compilation, transfer and curation"

IFA, Guidance on the use and preservation of digital photographs

FISH (Forum on Information Standards in Heritage), September 2006 v.1, A Six Step Guide to Digital Preservation, FISH Fact Sheet No. 1

Visual Arts Data Service and Technical Advisory Service for Images, Creating Digital Resources for the Visual Arts: Standards and Good Practice

AHDS Guides to Good Practice – Julian Richards and Damian Robinson (eds), Digital Archives from Excavation and Fieldwork: Guide to Good Practice, Second Edition

Printing the images:

In view of the currently unproven archival performance of digital data it is always desirable to create hard copies of images on paper of archival quality.

A selection of the images will be printed in the finished report for the HER, two images per A4 page.

When preparing files for printing, a resolution of 300dpi at the required output size is appropriate.

A **full set** of images will also be professionally printed in black and white and colour for submission as part of the site archive.

Use processing companies that print photos to high specifications. Commercial, automatic processing techniques do not meet archival standards and must not be used.

All prints for the archive must be marked on the back with the project identifier (e.g. site code) and image number.

Store prints in acid-free paper enclosures or polyester sleeves (labelled with image number)

Include an index of all photographs, in the form of running lists of image numbers

The index should record the image number, title and subject, date the picture was taken and who took it

The print sleeves and index will either be bound into the paper report or put in an A4 ringbinder which is labelled with the site name, year and archaeological unit on its spine.

Plans and drawings

The finished report must include a plan and section of each trench (even where no archaeological remains are recorded) plus plans and sections through excavated archaeological features.

The plans will include at least two site grid points and will show section line end points.

The plans will depict building material (i.e. brick and stone) where a complex of structures has been found.

Where there is a complex of interlocking multi-phased structures, a phasing plan will also be included.

There will be elevation drawings of any standing structures such as walls.

Pro-forma context sheets will be used.

All deposits and the base of the trench will be levelled. Levels will be expressed as metres above Ordnance Datum.

Stratigraphy shall be recorded even when no archaeological features have been recognised.

A 'Harris' matrix will be compiled where stratified deposits are recorded.

2) Post-excavation and report production

Finds Processing and Storage

The Archaeological Contractor will process and catalogue the finds in accordance with Museum and Galleries Commissions Guidelines (1992) and the UKIC Conservation Guidelines, and arrange for the long term disposal of the objects on behalf of the Client. A catalogue of finds and a record of discard policies, will be lodged with the finds for ease of curation.

Finds shall be recorded and processed in accordance with the IFA Guidelines for Finds Work

Finds will be assessed by an experienced finds specialist.

See 'Investigative Conservation. Guidelines on how the detailed examination of artefacts from archaeological sites can shed light on their manufacture and use', English Heritage, 2008.

Human and animal bone assemblages should be assessed by a recognised specialist (see Appendices 2 and 3 for more information).

Industrial slag and metal working debris will be assessed by a specialist.

Assessment should include x-radiography of all iron objects (after initial screening to exclude recent debris) and a selection of non-ferrous artefacts (including all coins). Refer to "Guidelines on the x-radiography of archaeological metalwork, English Heritage, 2006.

Brick dimensions will be measured and a note made of the bonding material.

If necessary, pottery sherds and bricks should be recommended for Thermo-luminescence dating. See 'Luminensence Dating: guidelines on using luminescence dating in archaeology', English Heritage, 2008.

Inductively-coupled plasma spectroscopy (ICPS) and thin sectioning can be used to establish the chemical composition of clay fabric (pottery), which helps to locate production sites and identify the products of known sites.

Finds processing, storage and conservation methods must be broadly in line with current practice, as exemplified by the IFA "Standard and guidance for the collection, documentation, conservation and research of archaeological materials", 2001. Finds should be appropriately packaged and stored under optimum conditions, as detailed in the RESCUE/UKIC publication "First Aid for Finds" (Watkinson and Neal 1998). Proposals for ultimate storage of finds should follow the UKIC publication "Guidelines for the Preparation of Excavation Archives for Long-term Storage" (Walker 1990). Details of methodologies may be requested from the Archaeological Contractor.

Other useful guidance – "A Strategy for the Care and Investigation of Finds", English Heritage, 2003, "Finds and Conservation Training Package", English Heritage, 2003.

All objects must be stored in appropriate materials and conditions to ensure minimal deterioration. Advice can be sought from Jacqui Huntley of English Heritage (07713 400387) where necessary.

PRODUCTS

The report

1. The Archaeological Contractor must produce an interim report of 200 words minimum, **two weeks after the completion of the field-work**, for the Client and the Planning Authority, with a copy for information to the County Archaeologist. This will contain the recommendations for any further work needed on site.

2. The production of Site Archives and Finds Analysis will be undertaken according to English Heritage Guidelines - Managing Archaeological Projects 2nd Edition ('MAP2') 1991 and Management of Research Projects in the Historic Environment (MoRPHE) 2006.

3. A full archive report or post-excavation assessment, with the following features should be produced **within six months of the completion of the field-work**. All drawn work should be to publication standard. The report must include:

* Location plan of excavation area and grid reference of site
* Site narrative – interpretative, structural and stratigraphic history of the site
* Plans showing major features and deposit spreads, by phase, and section locations
* Sections through excavated features with levels
* Elevation drawings of any walls etc. revealed during the excavation
* Artefact reports – full text, descriptions and illustrations of finds
* Tables and matrices summarising feature and artefact sequences.
* Archive descriptions of contexts, grouped by phase (not for publication)
* Deposit sequence summary (for publication/deposition)
* Colour photographs of trenches and of archaeological features and finds
* Laboratory reports and summaries of dating and environmental data, with collection methodology.
* A consideration of the results of the field-work within the wider research context (ref. NERRF).
* Recommendations for further analysis of finds or environmental samples

* Copy of this specification

4. One bound and collated copy of the report needs to be submitted:

- for deposition in the County HER at the address on the first page.

Three digital copies (pdf of the report on CD) must be submitted:

- one for the commissioning client
- one for the planning authority (Sunderland City Council) – this must be formally submitted by the developer to the planning department with the appropriate fee.
- one for deposition in the County HER at the address below. This CD will also include all of the digital images as TIFFs and the accompanying metadata.

PLEASE DO NOT ATTACH THE HER'S CD TO THE PAPER REPORT AS THEY ARE STORED SEPARATELY

The report and CD for the HER must be sent by the archaeological consultant or their client directly to the address below. If the report is sent via the planning department, every page of the report will be stamped with the planning application number which ruins the illustrations. The HER is also often sent a photocopy instead of a bound colour original which is unacceptable.

Publication

The results are likely to warrant publication in a suitable archaeological journal. The tender should therefore include an estimated figure for the production of a short report of, for example 30 pages, in a journal such as Archaeologia Aeliana, the Arbeia Journal, Industrial Archaeology Review or Durham Archaeological Journal. This is merely to give the commissioning client an indication of potential costs.

Before preparing a paper for publication, the archaeological contractor must discuss the scope, length and suitable journal with the County Archaeologist.

Archive Preparation and Dissemination

The archive should be a record of every aspect of an archaeological project – the aims and methods, information and objects collected, results of analysis, research, interpretation and publication. It must be as complete as possible, including all relevant documents, records, data and objects {Brown, 2007, 1}.

The site archive (records and materials recovered) should be prepared in accordance with Managing Archaeological Projects, Second Edition, 5.4 and appendix 3 (HBMC 1991), MoRPHE Project Planning Notes 2006 PPN3 – Archaeological Excavation, "Archaeological documentary archives" IFA Paper No.

1, "Archaeological Archives – creation, preparation, transfer and curation" Archaeological Archives Forum etc., Guidelines for the Preparation of Excavation Archives for Long Term Storage (UKIC 1990) and "Archaeological Archives – A guide to best practice in creation, compilation, transfer and curation" by Duncan H. Brown, Archaeological Archives Forum, July 2007.

Documentary Archive

The documentary archive comprises all records made during the archaeological project, including those in hard copy and digital form.

This should include written records, indexing, ordering, quantification and checking for consistency of all original context sheets, object records, bulk find records, sample records, skeleton records, photographic records (including negatives, prints, transparencies and x-radiographs), drawing records, drawings, level books, site note-books, spot-dating records and conservation records, publication drafts, published work, publication drawings and photographs etc.

A summary account of the context record, prepared by the supervising archaeologist, should be included.

All paper-based material must at all times be stored in conditions that minimise the risk of damage, deterioration, loss or theft.

Do not fold documents

Do not use self-adhesive labels or adhesive or tape of any kind

High quality paper (low-acid) and permanent writing materials must be used.

Original drawings on film must be made with a hard pencil, at least 4H.

Do not ink over original pencil drawings.

Use polyester based film for drawings (lasts longer than plastic).

Store documents in acid-free, dust-proof cardboard boxes

Store documents flat

All documents must be marked with the project identifier (e.g. site code) and/or the museum accession number.

All types of record must use a consistent terminology and format.

Use non-metal fastenings, and packaging and binding materials that ensure the longevity of documents.

Copies of reports and appropriate drafts, with associated illustrative material, must be submitted for inclusion with the archive.

Material Archive

The material archive comprises all objects (artefacts, building materials or environmental remains) and associated samples of contextual materials or objects.

All artefacts and ecofacts retained from the site must be packed in appropriate materials.

All finds must be cleaned as appropriate to ensure their long-term survival

All metal objects retained with the archive must be recorded by x-radiograph (except gold or lead alloys or lead alloys with a high lead content and objects too thick to be x-rayed effectively e.t.c.)

The archive should include all environmental remains recovered from samples or by hand, all vertebrae remains not used for destructive analysis, environmental remains extracted from specialist samples (such as pollen preparations in silicone oil).

All finds must be marked or labelled with the project and context identifiers and where relevant the small-finds number

Use tie-on rot-proof labels where necessary

Bulk finds of the same material type, from the same context, may be packed together in stable paper or polythene bags

Mark all bags on the outside with site and context identifiers and the material type and include a polyethylene label marked with the same information

Use permanent ink on bags and labels

Sensitive finds must be supported, where appropriate, on inert plastic foam or acid-free tissue paper. It is not advisable to wrap objects in tissue as the unwrapping could cause damage.

The archive will be placed in a suitable form in the appropriate museum (Tyne and Wear Museums).

Contact Alex Croom at Arbeia Roman Fort (0191 4544093).

A letter will be sent to the County Archaeology Officer within six months of the report having been submitted, confirming where the archive has been deposited.

Digital Archive

Copy of the report on CD as a pdf plus all of the digital images as TIFFs.

See MoRPHE Technical Guide 1 – Digital Archiving & Digital Dissemination 2006.

Archaeology Data Service
The digital archive including the image files can, if the appointed archaeologist and commissioning client choose to, be deposited with the ADS (The Archaeology

Data Service) which archives, disseminates and catalogues high quality digital resources of long-term interest to archaeologists. The ADS will evaluate datasets before accepting them to maintain rigorous standards (see the ADS Collections Policy). The ADS charge a fee for digital archiving of development-led projects. For this reason deposition of the images with the ADS is optional.

Archaeology Data Service
Department of Archaeology
University of York
King's Manor
York
YO1 7EP
01904 433 954 Web: http://ads.ahds.ac.uk

SIGNPOSTING

OASIS

The Tyne and Wear County Archaeologist supports the Online Access to the Index of Archaeological Investigations (OASIS) project. This project aims to provide an online index/access to the large and growing body of archaeological grey literature, created as a result of developer-funded fieldwork.

The archaeological contractor is therefore required to register with OASIS and to complete the online OASIS form for their evaluation at http://www.oasis.ac.uk/. Please ensure that tenders for this work takes into account the time needed to complete the form.

Once the OASIS record has been completed and signed off by the HER and NMR the information will be incorporated into the English Heritage Excavation Index, hosted online by the Archaeology Data Service.

The ultimate aim of OASIS is for an online virtual library of grey literature to be built up, linked to the index. The unit therefore has the option of uploading their grey literature report as part of their OASIS record, as a Microsoft Word document, rich text format, pdf or html format. The grey literature report will only be mounted by the ADS if both the unit and the HER give their agreement. The grey literature report will be made available through a library catalogue facility.

Please ensure that you and your client understand this procedure. If you choose to upload your grey literature report please ensure that your client agrees to this in writing to the HER at the address below.

For general enquiries about the OASIS project aims and the use of the form please contact: Mark Barratt at the National Monuments Record (tel. 01793 414600 or oasis@english-heritage.org.uk). For enquiries of a technical nature please contact: Louisa Matthews at the Archaeology Data Service (tel. 01904 433954 or oasis@ads.ahds.ac.uk). Or contact the Tyne and Wear Archaeology Officer at the address below.

The tender

Tenders for the work should contain the following:-

1. Brief details of the staff employed and their relevant experience
2. Details of any sub-contractors employed
3. A quotation of cost, broken down into the following categories:-
   * Costs for the excavation, incl. sub-headings of staff costs on a person-day basis, transport, materials, and plant etc.
   * Post-excavation costs, incl. storage materials
   * Cost of Environmental analysis and scientific dating per sample
   * Estimated cost for full publication of results in an archaeological journal
   * Overheads
4. An indication of the required notification period (from agreement to start date) for the field-work; the duration of fieldwork and the expected date for completion of the post-excavation work (a maximum of 6 months after completion of the fieldwork)

Monitoring

The Archaeological Contractor will inform the County Archaeologist of the start and end dates of the excavation to enable the CA to monitor the work in progress.

Should important archaeological deposits be encountered, the County Archaeologist must be informed. If further archaeological evaluation is required on this site, then the archaeological contractor must submit a written scheme of investigation for approval by the CA before extending the size of the trenches.

APPENDICES

1 Environmental Sampling, Scientific Analysis and Scientific Dating

This is a compulsory part of the evaluation exercise.

Advice on the sampling strategy for environmental samples and samples for scientific dating etc. must be sought from Jacqui Huntley, Historic England Advisor for Archaeological Science (07713 400387) **before** the evaluation begins. The sampling strategy should include a reasoned justification for selection of deposits for sampling.

Scientific investigations should be undertaken in a manner consistent with "The Management of Archaeological Projects", English Heritage 1991 and with "Archaeological Science at PPG16 Interventions: Best Practice for Curators and Commissioning Archaeologists", English Heritage, 2004.

See also 'Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post excavation', English Heritage, second edition 2011.

https://www.historicengland.org.uk/images-books/publications/environmental-archaeology-2nd/

English Heritage guidance documents on archaeological science can be downloaded as pdf files from www.helm.org.uk or www.historicengland.org.uk > Learning and Resources > Publications > Free Publications.

See also the Environmental Archaeology Bibliography (EAB):
http://ads.ahds.ac.uk/catalogue/specColl/eab_eh_2004/

and the NMR sciences thesaurus:

http://thesaurus.english-heritage.org.uk/thesaurus.asp?thes_no=560

There must be full specialist liaison throughout the project – this need not necessarily be face-to-face.

Sampling should be demonstrated to be both fit for purpose and in-line with the aims and objectives of the project.

The choice of material for assessment should be demonstrated as adequate to address the objectives.

Evaluations and assessment of scientific material should provide clear statements of their potential and significance in addition to descriptive records. These statements should relate to the original objectives but may also lead to new or modified objectives.

Post excavation analysis and interpretation requires sufficient information exchange and discussion to enable scientific specialists to interpret their material within the established intellectual framework.

Archaeological and scientific analyses should be integrated as fully as possible. It is not acceptable to leave the scientific analyses simply as appendices.
Archive reports should include full data from all specialist materials. All reports, including any publications, must present sufficient primary data to support the conclusions drawn.

{From '10 principles of good practice in archaeological science' by English Heritage 2010}.

Types of sample

Flotation samples are used to recover charred and mineral-replaced plant remains, small bones, industrial residues etc. Such samples should be whole earth, 40-60 litres or 100% of small features. The flot mesh size should be 0.25-0.3mm. The residue sieve size should be 0.5-1mm. The flot and <2mm residue should be sorted under the microscope. >2mm residues can be sorted by eye.

Coarse-sieved samples are used to recover small bones (such as bird and fish), bone fragments, molluscs and small finds (beads, pottery, coins etc). Such samples should be 100 or more litres, wet or dry sieved, minimum mesh 2mm. Specialist advice is recommended.

Other types of sample are monoliths, specialist, cores and small spot. These are taken for specific reasons and need specialists.

Aims and objectives

Aims of environmental sampling – to determine the abundance/concentration of the material within the features and how well the material is preserved, to characterise the resource (the site) and each phase, to determine the significance of the material and its group value, what crop processing activities took place on the site? What does this tell us about the nature of the site? Is there any evidence for changes in the farming practice through time? How did people use this landscape? Can we place certain activities at certain locations within the site? Function and date of individual features such as pits, hearths etc. Are the charred assemblages the result of ritual deposition or rubbish? Is the charcoal the result of domestic or industrial fuel?

Deposits should be sampled for retrieval and assessment of the preservation conditions and potential for analysis of biological remains (English Heritage 2002). Flotation samples and samples taken for coarse-mesh sieving from dry deposits should be processed at the time of fieldwork wherever possible. Sieving recovers fish, amphibian, small bird and mammal bone, small parts of adult mammals and young infused bones which may be under-represented otherwise. However it is noted that sticky clay soils in this region make sieving difficult. Discuss the potential for sieving with Regional Advisor for Archaeological Science.

Environmental samples (bulk soil samples of 30-40 litres volume) will be collected by the excavator from suitable (i.e. uncontaminated) deposits. It is suggested that a large number of samples be collected during evaluation from which a selection of the most suitable (uncontaminated) can be processed. All tenders will give a price for the assessment, full analysis, report production and publication per sample.

The full 30-40 litre sample must be assessed by the laboratory, not just a small sub-sample.

The following information should be provided with the environmental samples to be processed – brief account of nature and history of the site, aims and objectives of the project, summary of archaeological results, context types and stratigraphic relationships, phase and dating information, sampling and processing methods, sample locations, preservation conditions, residuality/contamination etc.

Laboratory processing of samples shall only be undertaken if deposits are found to be reasonably well dated, or linked to recognisable features and from contexts the derivation of which can be understood with a degree of confidence.

A range of features, and all phases of activity, need to be sampled for charred plant remains and charcoal. Aceramic features should not be avoided as the plant remains from these features may help to date them. Deep features should be sampled in spits to pick up changes over time. Part or all of each of the contexts should be processed. In general samples should be processed in their entirety. All flots should be scanned, and some of the residues.

Scientific Dating

Deposits will be assessed for their potential for radiocarbon, archaeomagnetic and Optically Stimulated Luminescence dating.

See 'Archaeomagnetic Dating: Guidelines on producing and interpreting archaeomagnetic dates', English Heritage, 2006 and

'Luminescence Dating: guidelines on using luminescence dating in archaeology', English Heritage, 2008.

Timbers will be assessed for their potential for dendrochronology dating. Sampling should follow procedures in "Dendrochronology: guidelines on producing and interpreting dendrochronological dates", Hillam, 1998.

All tenders will quote the price of these techniques per sample.

For large excavations, particularly of prehistoric sites, a specialist scientific dating consultant must be part of the post-excavation assessment team. They will ensure that money set aside for dating is well spent, that the most appropriate soil samples are submitted for dating, that the right number of samples are submitted for dating. The expert will explain what to date and why. Don't send off samples for dating just for sake of it. The English Heritage Scientific Dating team (contact Pete Marshall) can provide contact details for scientific dating experts.

Once radiocarbon date results come back from the lab, avoid eyeballing your C14 dates. Modelling gives better date estimates.

AMS can now be used to date cremated bone.

Pollen

Pollen samples can be taken from features such as lakes, ponds, palaeochannels, estuaries, saltmarshes, mires, alluvium and colluvium, and from waterlogged layers in wells, ditches and latrines etc. Substances such as honey, beer or food residues can be detected in vessels. Activities such as threshing, crop processing and the retting of flax can be identified. When taken on site, pollen samples should overlap. Your regional science advisor can advise on the type of corer or auger which would be most appropriate for your site. Samples need to be wrapped in clingfilm and kept dark and cool. Make a description of the sediments in which the pollen was found, and send this with the sample to be assessed.

Forams and diatoms

Coastal or estuary sites (even those which are now well drained) are suitable for sampling for foraminifera. Diatoms can also be found on marine sites, but also in urban settings (sewers, wells, drains, ditches etc). They only survive in waterlogged conditions. These aquatic microfossils are used as proxy indicators of the former aquatic ecological conditions on site, changes in sea levels and temperature, salinity, PH and pollution. Forams are taken from cores, monolith tins or bulk samples. Diatoms are cut from monolith tins or cores or taken as spot samples.

Insects

Insects, which are useful as palaeoenvironmental indicators, survive best in waterlogged deposits such as palaeochannels and wells. They can provide information on climate change and landscape reconstruction as some species are adapted to particular temperatures, habitats or even particular trees. Certain insects can indicate the function of a feature or building (eg. Weevils, which were introduced by the Romans, often indicate granary sites, parasites will indicate the presence of particular animals such as sheep or horse, latrine flies survive in the mineral deposits in latrines, or in the daub of medieval buildings etc). Samples need to be sealed (eg. in a plastic box).

Industrial Activity

Where there is evidence for industrial activity, macroscopic technological residues should be collected by hand. Separate samples should be collected for micro-slags (hammer-scale and spherical droplets). Guidance should be sought from the English Heritage Regional Science Adviser on the sampling strategy for metalworking features and advice on cleaning and packaging. Specialist on-site advice must be sought on identification of metalworking features. Slag and metal working debris must be assessed by a specialist. Scientific analysis (such as x-ray fluorescence, chemical analysis, metallography or scanning electron microscope) of slag can provide information on the melting temperature, chemical composition (is it iron, zinc, copper etc), microstructure (the type and shape of the crystals), physical properties (the hardness or viscosity), isotopic composition (strontium_87 or strontium_88 etc) and mineralogical composition.

See "Archaeomagnetic dating", English Heritage, 2006

"Guidelines on the X-radiography of archaeological metalwork", English Heritage, 2006.

Historical Metallurgy Society, 2008, "Metals and metalworking: a research framework for archaeometallurgy".

Centre for Archaeology Guidelines on 'Archaeometallurgy' 2001.

'Science for Historic Industries: Guidelines for the investigation of 17th to 19th century industries', English Heritage, 2006.

Buried soils and sediments

Buried soils and sediment sequences should be inspected and recorded on site by a recognised geoarchaeologist. Procedures and techniques in the English Heritage document "Environmental Archaeology", 2002 and "Geoarchaeology", 2004 should be followed.

See also 'Geoarchaeology. Using earth sciences to understand the archaeological record', English Heritage, 2007.

Wood

Sampling strategies for wooden structures should follow the methodologies presented in "Waterlogged wood. Guidelines on the recording, sampling, conservation and curation of waterlogged wood" R. Brunning, 1996. If timbers are likely to be present on your site, contact a wood specialist beforehand. Pre-excavation planning – determine questions to ask, agree on a sampling strategy, allocate reasonable time and budget. Soil samples should be taken of the sediments surrounding the timber. Keep the timbers wet! Record them asap on-site – plan, photograph, record the size and orientation of the wood (radial, tangential,transverse), any toolmarks, joints, presence of bark, insect damage, recent breaks, and if another piece of wood was on top of or below the piece sampled. Both vertical and horizontal positioning of wattling must be recorded. Wood samples can provide information on woodland management such as medieval coppicing, type of taxa (native or foreign), conversion technology (how the wood was turned into planks), building techniques and type of tools used.

Suitable samples should be submitted for dendrochronological dating. See English Heritage guidelines, 2004, "Dendrochronology".

Leather and organic materials

Waterlogged organic materials should be dealt with following recommendations in "Waterlogged Organic Artefacts – Guidelines on their Recovery, Analysis and Conservation", English Heritage, 2012 and "Guidelines for the care of waterlogged archaeological leather", English Heritage and Archaeological Leather Group 1995.

Glass

As glass-making furnaces are above ground structures, they rarely survive. However sample residues can produce glass fragments which define glass working even though no traces of furnaces survive.
Excavations at Whitby Abbey recovered glassworking waste from preliminary sampling. Targeted bulk sampling in subsequent years recovered more evidence for glass working. Raw glass, twisted rods of glass and a possible glass inlay for an illustrated book were found. Similar glass rods were found at St. Gregory's Minster at Kirkdale, North Yorkshire.

Analysis can find out where glass was imported from (a lot of Roman glass came from Alexandria).

Analysis of the composition of glass can show varying additives and salt composition. At Whitby Abbey the varying salt composition in glass throughout the Early Medieval period reflected climate change.

Is the glass made from recycled glass waste or raw materials?

Is there evidence of glass blowing?

English Heritage has guidance forthcoming in 2010.

2 Animal Bone

Animal bone can explore themes such as hunting and fowling, fishing, plant use, trade network, seasonality, diet, butchery, animal husbandry, food procurement, age structures, farrowing areas, species ratios, local environment.

Domestic animal bone was used in prehistoric and Roman cremation rituals.

Post medieval cattle bones – small cow bones invariably represent animals which produced high quality buttermilk for cheese. Big 'improved' cattle with large bones were produced for large quantities of meat and poorer quality milk. Large and small cattle bones are often found together on post medieval sites, usually with less of the small bones.

Animal bone assemblages should be assessed by a recognised specialist.

The specialist will need to know a brief account of the nature and history of the site, an account of the purpose, methods (details of sampling) for recovery of animal bones, and the main aims and results of the excavation, details of any specific questions that the excavator wants the animal bone specialist to consider, information about other relevant finds from the excavation (e.g. bone tools, fishing equipment, weaving equipment), specific information about each context that has produced significant quantities of animal bone (recovery method, phase, context type, position in relation to major structures, contamination by more recent material, some indication of the amount of bone (by weight or by container size). See "Ancient Monuments Laboratory Advisory Note, "Assessment of animal bone collections from excavations", Sebastian Payne, 1991and "The Assessment of a collection of animal bones", S. Davis, n.d., Ancient Monuments Laboratory.

Fish bone

Because fish bones are so small, particularly freshwater and estuarine species, they are often only recovered in large bulk samples. Samples must always be sieved.

Rescue excavations carried out in the 1970s at the Iron Age hillfort of Broxmouth in East Lothian produced an assemblage of fish bone. Recent analysis of this material has proved the presence of large specimens of ling and other species which suggests that the Broxmouth population carried out deep-sea fishing. It has previously been suggested that Iron Age fishing would only have been undertaken by lines from the shore. It has also been suggested that fish was not consumed in Iron Age Britain due to religious or cosmological reasons {Hannah Russ, Ian Armit, Jo McKenzie, Andrew Jones, 2012, Deep-sea fishing in the Iron Age? New evidence from Broxmouth hillfort, South-east Scotland in Environmental Archaeology, Vol 17, Number 2, pp 177-184).

Roman agenda – did the Romans eat fish? Were they sourced locally or imported? Use of fish as a sauce (garum).
Excavations at Bridge Street, Chester showed that in the Roman period fish was eaten and was both locally sourced and imported (mullet and Spanish mackerel).
Medieval and post medieval agenda – evidence for the deep sea fishing 'revolution', size-biased collections, replacement or supplement of freshwater and estuarine fish in the diet by deep sea fish.

There was some herring exploitation in the early medieval period. Christian fasting from around 970 allowed fish to be eaten on Fridays which led to a huge demand for fish. There was an increase in marine fishing, fish trade and fish consumption (cod, haddock, ling, herring etc) around 1000 AD. Middens provide evidence of commercial fishing. There was a decline in freshwater fish (cyprinid or carp, salmon, smelt, eel, pike) from the eleventh century.

Smoking fish is a recent practice. They were previously air dried and salted.

Newcastle was a major port. Samples should be sieved to retrieve fish and bird bones along with small parts of other animal skeletons and young infused bones.

A crane bone was recovered from excavations at Tuthill Stairs, Newcastle – a rare find.

Herring bones are so small that they can only be retrieved by 2mm sieving.

Clay soils are difficult to sieve, hot water can help.

Acidic soils mean poor preservation of bone.

See English Heritage 2002, "Environmental Archaeology – a guide to the theory and practice of methods from sampling and recovery to post excavation", Centre of Archaeology Guideline 1.

Isotope analysis can determine where the fish were coming from – North Sea, Scandinavia, Newfoundland, Iceland etc.

There is an excellent reference collection of fish bone at York.

Fish bones should be archived to museums for future dating and isotope analysis where this is not undertaken as part of the post-excavation process.

3 Human Remains

Human remains must be treated with care, dignity and respect.

Excavators must comply with the relevant legislation (essentially the Burial Act 1857) and local environmental health concerns. If found, human remains must be left in-situ, covered and protected. The archaeological contractor will be responsible for informing the police, coroner, local Environmental Health department and the County Archaeologist. If it is agreed that removal of the remains is essential, the archaeological contractor will apply for a licence from the Home Office and their regulations must be complied with.

The excavation area must be shielded from public view with screens.

The excavation of human remains is a delicate and time consuming operation. The process can take one or two days per skeleton. If the skeleton cannot be excavated all in one day cover it with plastic sheeting overnight to prevent it from drying out. The remains should be excavated as completely as possible to give the bioarchaeologist the maximum amount of data.

A bioarchaeologist should be employed for any burial excavation from the start of the project.

A basic diagram of a skeleton should be available on site for staff to consult (such as that in Abrahams et al, 2008, McMinn's the human skeleton).

Once the top of a skeleton is reached, excavation will be undertaken using delicate tools such as paintbrushes, teaspoons, dental equipment and plasterers' leaves.

Recover all teeth, hand and foot bones.

Excavate the pubic symphysis of the pelvis with care as it is needed for age estimation of adults.

The ends of the ribs that meet the sternum are useful for age estimation of adults.

There will be a possibility that gall, bladder and kidney stones may survive. Sesamoid bones may be present in the hands and feet, calcified cartilages in the neck, on the ribs and on the hyoid bone in the neck.

Foetal bones may be present in the abdominal area of female skeletons.

The bones should be shaded from strong sunlight so they do not dry out and crack.

Bones should be drawn at 1:10 using a planning frame. Manual and digital photographs should be taken with a scale and a magnetic north arrow clearly visible. 3D recording using an EDM may be undertaken.

Site inspection by a recognised osteologist is desirable for isolated burials and essential for cemeteries. The remains will be recorded in-situ and subsequently lifted, washed in water (without additives). They will be marked and packed to standards compatible with "Excavation and post-excavation treatment of cremated and inhumed human remains", McKinley and Roberts, 1993. After excavation, the remains will be subject to specialist assessment.

Analysis of the osteological material should take place according to published guidelines "Human Remains from Archaeological Sites, Guidelines for producing assessment documents and analytical reports, English Heritage, 2002.

There is a new (2013) English Heritage guideline for the destructive sampling of archaeological human remains for scientific analysis 'Science and the Dead'.

Some of the potential benefits from the study of human skeletons – demography, growth profiles, patterns of disease, genetic relationships, activity patterns, diet, burial practices, human evolution. New scientific techniques available include DNA and stable isotope analyses.

Diseases which yield ancient DNA – leprosy, syphilis, tuberculosis, mycobacterium bovis (animal form of TB passed to humans when they shared a living space from Neolithic period onwards).

Radiocarbon dating can be used to chronologically phase burial grounds and track developments in demographic change and variations in the health of the population.

Cremation destroys the crown of the tooth so it cannot be dated (the closure of the cranium vault can be used in adults for dating instead). Cremation also fragments bone, distorts it due to lack of water, shrinks the bone, causes microstructural alteration and destroys organic components (so DNA analysis not possible).

AMS can now be used to date cremated bone.

Carbon and nitrogen stable isotope analysis can be used to study diet, usually to address broad questions about a wider population, rather than to study an individual. Most studies use 30 or more skeletons. Studies have included how social position influenced diet and how diet varied with geographic location.

Strontium and oxygen stable isotope analysis can be used to determine where individuals originated from.

The final placing of the remains after scientific study and analysis will be agreed beforehand.

Health & Safety associated with human remains:

Micro-organisms that might cause harm to humans are extremely unlikely to survive beyond about 100 Years.

More recent remains could be more hazardous to health as they may be in sealed lead coffins. Lead coffins should not be opened. They should be reburied intact without archaeological examination.

There is a danger of lead poisoning arising from high levels of lead in the atmosphere generated by lead coffins (see H. Needleman, 2004, Lead poisoning in Annual Review of Medicine, 55, pp. 209-22).

The possible risks of contracting disease from excavated human remains are highly negligible but could include the virus smallpox, tetanus and anthrax spores, the bacterial infection leptospirosis and the fungal disease mycoses (a problem in dry dusty soils and in crypts).

Excavators should be up-to-date with tetanus inoculations.

Anthrax can come from materials derived from animals – coffin pads, pillows or coffin packing.

Working with human remains may cause psychological stress (see J. Thompson, 1998, Bodies, minds and human remains, in M. Cox (ed) 1998, Grave concerns: Death and Burial in England 1700-1850, pp 197-201).

Normal hygiene measures should be undertaken – washing hands, wearing masks and gloves. Heavily soiled clothing should be burned at an HSE approved site.

Further guidance is available in:

"Guidance for best practice for treatment of human remains excavated from Christian burial grounds in England", The Church of England and English Heritage, 2005 (www.english-heritage.org.uk/upload/pdf/16602_HumanRemains1.pdf)

"Church Archaeology: its care and management", Council for the Care of Churches, 1999

Charlotte A. Roberts, 2009, 'Human Remains in archaeology: a handbook', CBA Practical Handbooks in Archaeology No. 19
S Mays, 2010, The Archaeology of Human Bones, second edition

The Advisory Panel on the Archaeology of Christian burials in England can provide free well-informed advice with consideration of relevant religious, ethical, legal, archaeological and scientific issues. Panel's website:
http://www.britarch.ac.uk/churches/humanremains/index.html
or email the secretary simon.mays@english-heritage.org.uk

4 Treasure

All finders of gold and silver objects, and groups of coins from the same finds, over 300 years old, have a legal obligation to report such items under the Treasure Act 1996. Prehistoric base-metal assemblages found after 1st January 2003 also qualify as Treasure.

Summary Definition of Treasure (Portable Antiquities Scheme www.finds.org.uk)

The following finds are Treasure under the Act, if found after 24 September 1997 (or, in the case of category 2, if found after 1 January 2003):

- Any metallic object, other than a coin, provided that at least 10 per cent by weight of metal is precious metal (that is, gold or silver) and that it is at least 300 years old when found. If the object is of prehistoric date it will be Treasure provided any part of it is precious metal.
- Any group of two or more metallic objects of any composition of prehistoric date that come from the same find (see below)
- Two or more coins from the same find provided they are at least 300 years old when found and contain 10 per cent gold or silver (if the coins contain less than 10 per cent of gold or silver there must be at least ten of them). Only the following groups of coins will normally be regarded as coming from the same find: Hoards that have been deliberately hidden; Smaller groups of coins, such as the contents of purses, that may been dropped or lost; Votive or ritual deposits.
- Any object, whatever it is made of, that is found in the same place as, or had previously been together with, another object that is Treasure.
- Single precious metal coins that have been modified into objects – that is, altered in some way as to make it likely that they were taken out of circulation - can, if older than 300 years old, qualify as Treasure. This is

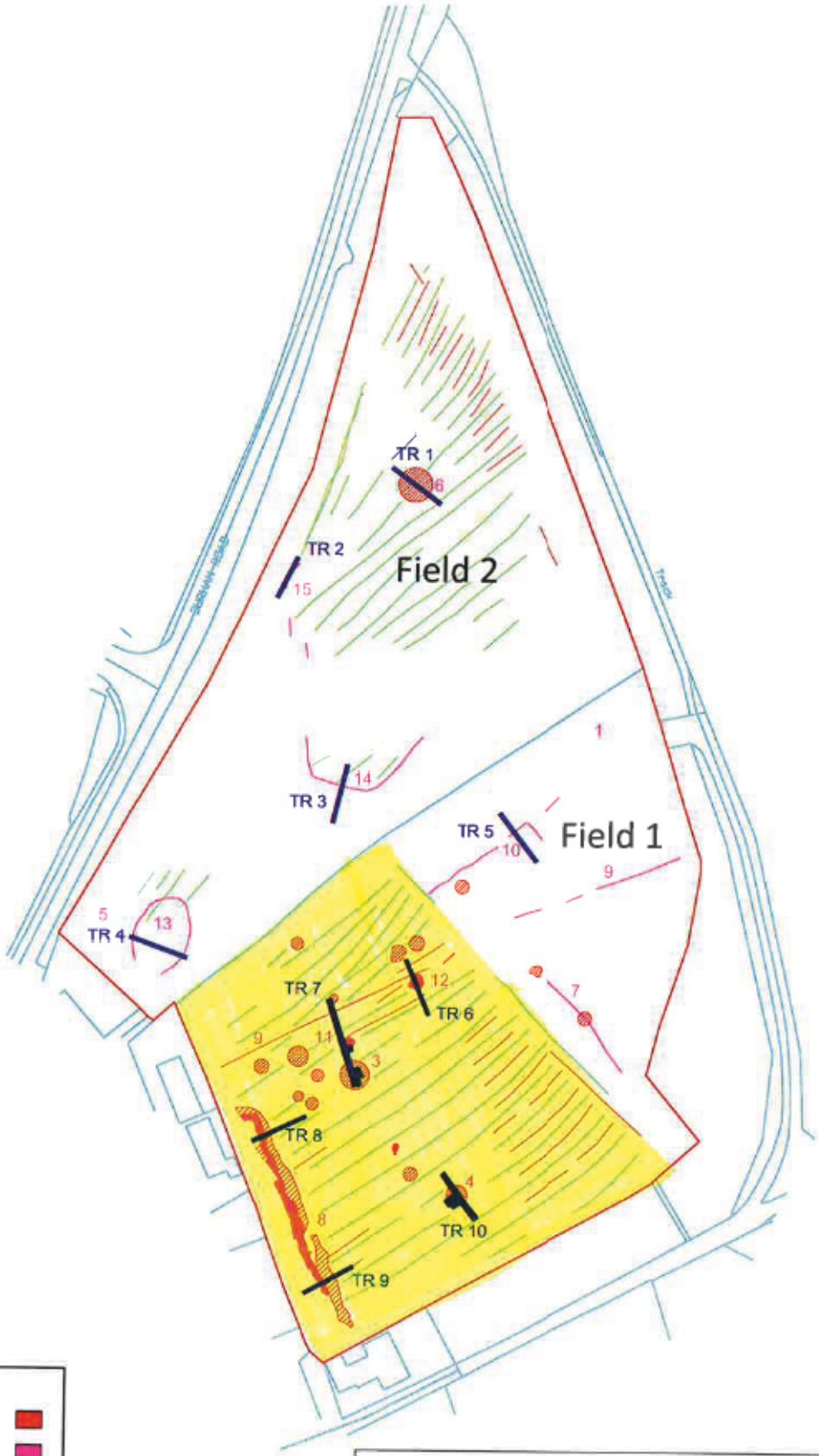
usually seen in the form of a conversion of the coin into a brooch or pendant, or some other form of jewellery or dress accessory, evidence of which can include the addition of a suspension loop to the top, a pin (or the remains of one) at the back, or gilding. Additionally, piercings can be present.

- Any object that would previously have been treasure trove, but does not fall within the specific categories given above. Only objects that are less than 300 years old, that are made substantially of gold or silver, that have been deliberately hidden with the intention of recovery and whose owners or heirs are unknown will come into this category.

Note: An object or coin is part of the 'same find' as another object or coin if it is found in the same place as, or had previously been together with, the other object. Finds may have become scattered since they were originally deposited in the ground.

If anything is found which could be Treasure, under the Treasure Act 1996, it is a legal requirement to report it to the local coroner within 14 days of discovery. The Archaeological Contractor must comply with the procedures set out in The Treasure Act 1996. Any treasure must be reported to the coroner and to The Portable Antiquities Scheme Finds Liaison Officer, Ellie.cox@durham.gov.uk who can provide guidance on the Treasure Act procedures.

If you need this information in another format or language, please contact Jennifer Morrison, Archaeology Officer.



AREA OF STRIP + RECORD EXCAVATION

Figure 2: Trench location plan showing geophysical survey

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